







**S E L E C T I O N S**

FROM THE

**RECORDS**

OF THE

**Government of India,**

(MILITARY DEPARTMENT.)

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Published by Authority.

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**No. III.**

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**REPORT**

ON THE

**EXTENT AND NATURE**

OF THE

**SANITARY ESTABLISHMENTS**

FOR

**EUROPEAN TROOPS**

**IN INDIA.**

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CALCUTTA:

MILITARY DEPARTMENT PRESS,

MARCH 1862.

8921





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# PAPERS

RELATIVE TO

## SANITARY ESTABLISHMENTS.

From Colonel A. BECHER, C. B., Quarter Master General of the Army, to the Secretary to the Government of India, Military Department,—(No. 233C, dated Head Quarters, Calcutta, the 12th April 1861.)

IN forwarding for the information of His Excellency the Governor General, the accompanying documents received in this Department, relative to the hill site of “Dalhousie” on the Chumba Hills, north-east of Lahore, I am desired by the Commander-in-Chief to urge strongly on Government the great advantage which would result in every point of view for the establishment of a Military Sanatarium in that most favorable locality, the healthiness of which has been so satisfactorily tested, and the benefits of which have been experienced by so many private individuals who are fast establishing a station there.

2. The peculiarly dry character of the climate of Dalhousie gives it a great superiority over the other hill Sanataria for the majority of cases under which European soldiers in this country suffer, and it would doubtless obviate the necessity for sending home yearly the large number of invalids from the Punjaub Province, whose diseases are often aggravated from a residence at Kussowlie, or the other Sanataria in the Simla range. Sir Hugh Rose therefore feels sure, that great economy to the state would result from the early establishment of barracks for at least 100 invalids to be selected from the cases occurring in the Lahore and Sirhind divisions, as suggested by the Inspector General, Her Majesty's Hospitals in his Memorandum No. 82, dated 30th March 1861, attached.

From Lieutenant F. B. NORMAN, Deputy Assistant Quarter Master General of the Army, to the Quarter Master General of the Army,—(No. 368, dated Meean Meer, the 19th February 1861.)

IN July last I had the honor to forward a report on the Sanatorium of Dalhousie. In the 43rd paragraph of that report I stated that Assistant Surgeon Drysdale, Her Majesty's 79th Highlanders, had been appointed to the medical charge of Dalhousie.

2. Assistant Surgeon Drysdale having afterwards been appointed to the medical charge of Darjeeling, was relieved in the middle of August by Assistant Surgeon Davie of the same Regiment. In October Dr. Davie submitted his report on the Sanatorium, a copy of which I have the honor to annex.

3. I would wish to draw particular attention to one part of Dr. Davie's report. He says, "the comparative dryness of the atmosphere during the greater part of the rainy season, might make it a much more favorable residence for invalids affected with chronic dysentery and rheumatism, who do not appear to do well during the rainy season at those stations where the fall of rain is much greater, and the atmosphere accordingly more saturated with moisture." If further experience should prove that Dr. Davie is right, Dalhousie will be invaluable as supplying a great want, namely a Sanatorium to which soldiers could be sent, who are suffering from certain cases of disease, for which a residence in the damp climate of our present hill stations is found unsuited.

4. You are aware that I spent six weeks of last hot weather at Dalhousie. At the request of the Lieutenant-Governor I undertook to widen certain roads in the station. There was great delay in sending me the money, and I was unable to effect as much as I could have wished. On my leaving Dalhousie Dr. Davie continued the work. I annex a copy of my letter to the Judicial Commissioner, detailing what had been done.

5. Towards the end of October, Captain Charles Hutchinson, Superintending Engineer, 1st Circle, Punjaub, was directed to proceed to Dalhousie, to report upon the station and the road to it from the plains. Captain Hutchinson made a most favorable report on the station. He carefully examined, in company with Captain Nightingale, the road from Puthankote to Dalhousie, and recommended that Captain Night-

ingale's estimate, amounting to Company's Rupees 30,000, for widening the road to 8 feet, should be sanctioned. The construction of the aqueduct as far as the gully between Pukrota and Teera was sanctioned, and at once commenced. The estimate for an aqueduct with a channel 1 foot broad and 1 foot deep, amounted to less than 500 rupees.

6. Captain Craster, of the Engineers, has been appointed Executive Engineer at Dalhousie, and is now employed in widening such of the station roads as had not been widened by me, and in constructing the road from the plains.

7. About the 28th of this month, some 50 sites at Dalhousie will be put up to auction at an upset price of Company's Rupees 50 per acre.

8. I have now furnished all the information I have been able to obtain relative to Dalhousie. I am happy to say that the opinions I have expressed relative to the advantages it offers as a Sanatarium, have been corroborated by every one who has visited the place; and I feel sure that ere long it will become a favorite Sanatarium.

From Lieutenant F. B. NORMAN, Deputy Assistant Quarter Master General of the Army, to the Personal Assistant Judicial Commissioner,—(No. 1256, dated Lahore Division, Meean Meer, the 15th December 1860.)

I have the honor to submit, for the information of the Judicial Commissioner, the following "report" on the manner in which I expended the money paid to me by the Commissioner of Umritsur, under orders received from the Judicial Commissioner, for the purpose of improving the station roads at Dalhousie

2. Although I applied for the money to be paid to me on the 10th August, I did not receive it until the 13th September. As I was obliged to be back at Meean Meer by the 9th October, I was unable to widen and otherwise improve as great a length of road as I could have wished. On my leaving Dalhousie, Dr. Scott Davie who was in medical charge of the station, kindly undertook to continue the work; and as I only received the powder just as I was leaving, all the blasting operations were carried on under his superintendence.

Cause of greater length of road not having been widened.

### 3. In order to give a clear idea of the disposition of the station

Disposition of the five hills composing the station.

roads, it is necessary to give a slight description of the station itself. The

station of Dalhousie consists of five hills, four of which, Pukrota, Teera, Putrain, and Kuttullugh, run from the north-east to the south-west. Pukrota is the highest of the five, and forms the north-east boundary of the station: it has an elevation of about 8,000 feet. No houses have as yet been built on Pukrota, but one or two sites have been taken. The next hill is Teera, also called Peera Sona, the summit of which is 7,400 feet. Colonel Burnet has taken a site on the summit; Captain Perkins has also taken a site on this hill. Captain Nightingale's house is also on Teera, at an elevation of about 500 feet below Colonel Burnet's site. The next hill is Putrain. On the top of this hill is the large house built by Captain Fagan, now the property of Colonel Burnet. On this hill are three small houses built by Captain Fagan, now the property of Mr. Sparling of the Barce Doab Canal, and a house the property of Mr. McGuffren; all these houses are in habitable condition, and were all occupied during the past season, with the exception of the smallest house belonging to Mr. Sparling, which is only fit for an office. Next to Putrain is Kuttullugh, on which is the Thanah. The fifth hill is the Barrack Hill, called by the Natives Sonanatolla: it runs to the north from Teera, and is lower than Pukrota, Teera, and Putrain, but higher than Kuttullugh.

### 4. In all thirteen miles of road with an average width of 5 feet\*

Disposition of the station roads.

\* N. B.—Captain Fagan made the wall 6 feet wide, but owing to the falling of the sides, the average width was not more than 5 feet when I went up.

were traced out by the late Captain Fagan. The road from Puthan Kote runs into the station at the gully between Pukrota and Teera. From this

point a road runs north-east up the Pukrota Hill. The road intended to form the wall runs round Teera, and unites at the gully between Teera and Putrain, and from this point goes right round Putrain, thus the wall will be in the shape of the figure 8. On the south side of Putrain is the encamping ground. A road runs from the encamping ground to the Thanah at Kuttullugh—from the Thanah another road runs down to the Barrack Hill and joins a road from the gully between Putrain and Teera, running to and round the Barrack Hill. In addition to the above there are a few minor roads,

5. Before proceeding to Dalhousie in August, I consulted with Nightingale as to the best manner in which the money placed at my disposal could be laid out, and I have the honor to annex his reply. I agreed with him on all points except the necessity of making a new road from the point C to the gully B. The present road is, I think, on as good a level as need be. I however deferred to Captain Nightingale, and left this portion of the road untouched, except as regards repairing the bridges on it in a temporary manner.

6. As the portion of the wall on the south side of Teera had been Roads deemed most necessary to be widened. merely lock-spitted and in some parts was impassable, the expense of opening it out would have been considerable, I therefore determined to do nothing to this portion but to widen to 9 feet. The road from the gully A between Pukrota and Teera to the point C, and from the gully B between Teera and Putrain,—to widen the road right round Putrain to 9 feet—this I deem the most important road in the station, both with reference to there being five houses on the hill, and to the fact of the encamping ground being on the south side. The road from the gully B to the encamping ground was in very bad order, and owing to its being entirely cut through hard rock it presented some difficulties. I also determined, if time permitted, to widen to 9 feet the road from the gully between Putrain and Teera to the Barrack Hill, and as much of the road round the Barrack Hill as possible.

7. I arrived at Dalhousie on the 18th August, and having some Work when commenced and when discontinued. funds in my hands determined on at once commencing work in anticipation of receiving the 1,000 Rupees. I procured tools with the permission of Captain Nightingale from his godown, on condition of keeping them in repair. On the 23rd August I commenced work, and on the 4th October Dr. Davie took charge of the roads, and continued the work until 1st November, when he left to rejoin his Regiment.

8. The actual extent of road widened is as follows:—From the gully between Pukrota and Teera to the point marked C in Captain Nightingale's sketch, a distance of 2,750 feet—from the gully between Putrain and



Teera, right round Putrain, a distance of 4,750 feet—from the gully between Putrain and Teera to the Barrack Hill, a distance of 1,875 feet—and 910 feet of the road round the Barrack Hill, making a grand total of 1 mile 1668 yards, with the exception of 30 feet, lying through a high mass of rock, where the width is not more than 6 feet. The whole has been completed to an average width of 9 feet. The road has been made with a slope inwards; and as far as time would permit, attention had been paid to its drainage. The bridges between the point C and the gully B were also repaired in a temporary manner. The total sum spent was Co.'s Rs. 607-15. I have the honor to annex a detailed statement of the expenditure, and the receipt of the Officer in charge of the Goordaspore Treasury for Co.'s Rs. 392-1, the balance of the 1,000 rupees. The delay in submitting this statement has been caused by references having had to be made to Major Young regarding the price of the powder.

9. As it may possibly be interesting to the Judicial Commissioner, I annex a memorandum of the names of the visitors to Dalhousie during the past season.

Memorandum of visitors to Dalhousie during 1860.

From Captain C. W. NIGHTINGALE, Executive Engineer, to Lieutenant F. B. NORMAN, Assistant Quarter Master General of the Army,—(dated the 27th July 1860.)

IN reply to your note of the 26th July, relative to a grant of rupees 1,000 for improving the Dalhousie roads, and asking my opinion as to which road should be selected for improvement, I would strongly recommend the wall being taken in hand first, and opened out from the gully A, where it first enters the station as you come up from the waterfalls, on to the gully on the east side of Captain Fagan's house, and on round his site and above Captain Perkin's present house, back to the gully B. I wish much that I could explain on paper precisely what line I refer to; and unless you knew the place very well, you would hardly find the line, as a part of the present wall is irregularly laid out, and not on the true level, and this was seen and corrected by Captain Fagan when he was Executive Engineer there. When you are at the gully A, between Pukrota and Sonanatolla at the entrance to the station below my house on the eastern side, you will see three if not four roads, all starting off from the same point, and on the same north face of the hill, and all tend-

ing somewhat in the same direction. The second of these counting from the upper one, is the wall, laid out on a dead level ; and if you follow this road, until you come nearly to C, but not quite to the corner where you descend to get to the barrack site, you will see a slight trace quitting the wall, and running parallel with it, but a little higher up and eventually joining it again. At the gully B on the east side of Fagan's house, this slight trace (about 2 feet wide) is the true level for the wall ; and the lower line used as the wall is erroneous in its course, and it would, I think, be a great pity to widen that portion which would now perpetuate the original error.

I send a rough sketch of the points I refer to, but I can hardly hope that you can gather my meaning from it. Doubtless with so very small a sum as 1,000 Rs. it may be considered very extravagant to expend money in opening out a new line immediately above the one now existing, and which latter is six feet wide, but if you should think that, I would advise that portion remaining untouched just now, and that the other portions of the wall which are correctly laid out, should be widened to 8 feet clear as a commencement. The wall is a very beautiful pathway, and would, I should think, be the first selected by the whole community for improvement. I shall, I hope, be in Dalhousie the first week in September, and I trust you will not have left the station by that time. You can get every description of tools from the Dalhousie godown by applying for them to Major Young, my assistant, at Bhagsoo, and mentioning for what purpose they are required.

*List of Visitors to Dalhousie in 1860.*

Nos.	Gentlemen.	Ladies.
1	Major General Windham, C. B. Captain Dowdeswell. Major Drummond. Doctor Penny (twice.)	
5	Mr. Synthe, B. D. C. Captain Norman.  Captain Perkins. " Nightingale. " Holland	Mrs. Norman. Miss. Anley. Mrs. Perkins. " Nightingale. " Holland.
10	Lieutenant Copland.  Mr. Melville, C. S. Sir A. Lawrence. Colonel Burnet, B. A. Lieutenant Brown, B. A.	" Copland. " Mitchell.
15	Reverend Slaggett. Mr. Brown B. D. C. Captain Tannington, 51st Regiment. Lieutenant Free, B. A. Lieutenant James, B. A.	
20	Colonel Gaitskell, B. A. Assistant-Surgeon Drysdale, 79th Regiment. " Davie, " Printis, 7th Punjaub Infantry. " Clark, 5th European Cavalry.	
25	Mr. Tromm, 79th Regiment. Lieutenant Coventy, 79th Regiment. Serjeant Fraser, 79th Regiment. Mr. McGuffin. Captain Thomas.	
30	Lieutenant Jones. Mr. Egerton. Major J. Young. Captain Young. " Macpherson.	Mrs. Egerton.
35	Major Gulliver. Mr. Clark, P. R.	
38	Doctor Ross, 3rd European Cavalry. Colonel Hall, 3rd European Cavalry.	

(Signed) F. B. NORMAN, *Lieut.,*  
*Depy. Asst. Qr. Mr. Genl. of the Army.*

*Report on Dalhousie Sanatorium from 18th June to 31st October 1860, by Dr. G. S. DAVIE, Assistant Surgeon, Her Majesty's 79th Highlanders.*

The Sanatorium of Dalhousie is situated in latitude 32° 32' north, longitude 76' east, and includes within its boundary the summits of five hills which stretch from the north-east towards the south-west. The hill named Pukrota is the highest of the five hills, and forms the north-east boundary of the station ; it has an elevation of about 8,000 feet above the level of the sea. The hill named Kuttullugh forms the south-west limit of the station, and has an elevation above the level of the sea of about 5,700 feet. The intermediate hills increase in elevation from Kuttullugh to Pukrota. Open to the north as far as the snowy range, and to the south as far as the plains. The arrangement of the hills from north-east to south-west is favorable, as the prevailing winds being north and south. One hill does not intercept them from another. On the east the station is closed in by a chain of hills, of which Dyn Khoond is the highest. Pukrota is separated from these hills by a deep valley, at the bottom of which there is a tolerably large stream. On the west, the hills although much higher than those on the east, are at a considerable distance, and therefore leave the station comparatively open in that direction. The river "Ravee" flows between the hills on the west of Dalhousie.

*Vegetation.*—The vegetation is luxuriant ; stately oaks and rhododendrons are plentiful, and there is leguminous brushwood in great profusion ; there is also a great variety of Alpine plants and ferns in their season. The hills on the east are well wooded with pines, oaks, and rhododendrons : those on the west are bare, rocky, and barren.

*Soil.*—The soil is in many places rich in carbon ; in some places it is composed chiefly of clay and disintegrated granite ; on the whole it is dry, owing probably to its want of depth and a rocky sub-stratum composed chiefly of granite, gneiss, and slate, on which it rests. Taking into consideration the shallowness of the arable soil in most places, it possesses great resources. This is well shown during the rains, when the ground being saturated with moisture, plants grow in great luxuriance. With a little cultivation the soil could be made to bear all the vegetable in ordinary use. In some parts of the station potatoes of good quality, Indian corn, cucumbers, melons, and other vegetables are reared by the natives.

*Water.*—Water is scarce in Dalhousie during the hot and dry weather. The springs are few, and at a considerable distance below that part of the station occupied. There is however a perennial stream about two miles distant from the station in a north-east direction, which would afford an ample supply of excellent water. I believe this stream has its origin near the top of Dyn Khoond, at least 1,000 feet above Dalhousie, and is a continuation of the stream between Dyn Khoond and Pukrota. Until this water is conducted into the station, visitors, especially should they be numerous, will experience considerable inconvenience during the dry season, owing to the distance the water has to be carried.

The water obtained in and about Dalhousie is of excellent quality, and owing probably to the rocky nature of the ground over which it flows, contains no organic matter, and is but slightly impregnated with mineral matter. In short so pure is it that it will supply the place of distilled water for ordinary chemical purposes.

Hearing that a medicinal spring existed in the neighbourhood of Dalhousie, I visited it, in order to ascertain the nature of the water. The spring is situated about nine miles south-west of the station, immediately below a small village named Simlaetta. It is at least 3,000 feet lower than Dalhousie, and the road to the spring being simply a foot-path, is as rough and difficult as may be. The water is cool and pleasant to drink, does not taste in the least of iron, and must contain a very minute trace, if any, of that mineral, as the ordinary tests failed to detect its presence. The water is similar in its properties to that at Dalhousie, and probably has no medicinal virtue. The spring is well known to the surrounding inhabitants, but none could inform me of any disease in which the use of the water was supposed to be beneficial.

The iron mines are about four miles north of the spring.

There is a spring at Dooneira, said to be strongly impregnated with iron and sulphur; but as Dooneira is at a considerable distance from Dalhousie, the spring could not be of much service, as chalybeate waters lose much of their virtue when carried to any distance.

*Climate.*—The climate of Dalhousie during the past season was very salubrious, and there was no one among the numerous

visitors disappointed in their search after health; a few days often sufficed to effect a favourable change in the appetite and spirits. The air was generally clear, dry, and bracing, and the temperature in the shade at all times bearable during the hot months. Although the temperature in the open air was high during the day, the mornings and evenings were tempered by northerly and southerly breezes. For a hill station the fall of rain during the season was small, and what fell was chiefly in showers of various degrees of severity and duration, so that with the exception of a few days at the commencement of the rains, and a few days near their termination, there was always some part of the day during which one could be out of doors. The air felt damp very little longer than a shower lasted: an hour or two after a shower very little trace of it remained. Mist clouds often passed either partially or entirely over the station; but except on two or three occasions did not remain any length of time. Dust storms although often seen in the direction of the plains, only on one occasion reached the station.

Immediately before, during, and for a short period after the rains, thunder storms were frequent among the surrounding hills. Dalhousie was comparatively free of them. On the 26th of June the most severe thunder storm of the season passed over the station—the air became darkened and filled with dust from the plains—the lightning was vivid, the thunder loud and accompanied with heavy rain and violent wind. The storm lasted an hour and a half, but the wind and rain continued some time longer—a much less severe storm occurred on the 13th August.

The third and last of the season occurred on the afternoon of the 6th September—the lightning was close to the station and very vivid—the peals of thunder were quite deafening—the storm passed from the south-west to the north-east, and was followed by a violent north wind, heavy rain, and large hail stones.

The prevailing winds were north and south, and although occasionally violent, were in general mild and pleasant, moderating the temperature considerably.

The temperature and fall of rain were noted at the late Captain Fagan's house. This house is situated on the summit of a hill having

a mean elevation between that of Kuttullugh and Pukrota, and was therefore the best place that could have been chosen for ascertaining the average temperature of the station. Up to the 1st of August Dr. Drysdale only noted the temperature in the shade at sunrise, noon, and sunset. The thermometer was suspended under cover of the west verandah of the house; but as in this position it caught the rays of the afternoon sun, the temperature in the shade at sunset was represented higher than it would have been, had the sun's rays never reached the thermometer.

On the 15th September the shade thermometer was removed to the north side of the house, where the sun's rays did not play on it, and as was expected, the change effected a reduction in the temperature, as shown in the register at sunset: of course the thermometer being at the west side of the house did not matter so much during the rains, as the sun was often obscured by clouds at sunset, but before the rains commenced, it will be noticed that the temperature at sunset it often represented higher than at noon.

An additional thermometer having arrived, it was suspended in the open air facing the south, in order to catch the rays of the sun during the greater part of the day; a register was accordingly kept of the temperature in the open air from the 1st of August.

The first notice taken of the fall of rain was on the 19th of July, rain gauges not having been till then available. As however only a few trifling showers occurred previous to their arrival, the register of the fall of rain is pretty near the mark.

The following is a copy of the register of temperature and fall of rain from the 18th of June up to the 31st October 1860.

*Register of Temperature for June 1860.*

Dates. Temperature in the shade.			Dates. Temperature in the shade.			Remarks.		
June.	Sunrise.	Noon.	Sunset.	June.	Sunrise.		Noon.	Sunset.
	degrees.	degrees.	degrees.		degrees.	degrees.	degrees.	
18th...	70	82	86	25th...	74	85	73	
19th...	72	86	88	26th.	73	84	58	
20th...	74	88	86	27th..	67	78	82	
21st ...	78	82	88	28th..	62	62	65	
22nd..	72	86	90	29th..	69	74	82	
23rd..	74	83	78	30th..	71	79	81	
24th..	73	83	85					



*Mean Temperature in the shade from 18th to 30th June.*

Sunrise.	Noon.	Sunset.	Remarks.
degrees.	degrees.	degrees.	
71 $\frac{6}{13}$	80 $\frac{12}{13}$	80 $\frac{2}{12}$	

*Maximum Temperature in the shade from 18th to 30th June 1860.*

Sunrise.	Noon.	Sunset.	Remarks.
degrees.	degrees.	degrees.	
78	88	90	

*Minimum Temperature in the shade from 18th to 30th June 1860.*

Sunrise.	Noon.	Sunset.	Remarks.
degrees.	degrees.	degrees.	
62	62	58	The minimum temperature was due to the thunder storm of the 26th.

*General Remarks for June 1860.*

From the 18th to the 30th of June the weather was on the whole very pleasant. The breezes were chiefly southerly, a few slight showers occurred, and one severe thunder storm. Thunder storms being of frequent occurrence among the surrounding hills, had a beneficial effect on the temperature of Dalhousie. The temperature was not unpleasantly hot, and the air was clear, except before showers. Probably about three inches of rain fell from the 18th to the 30th. The mornings and evenings were very enjoyable.

*Register of Temperature and fall of rain for July 1860.*

Dates	Temperature in the shade.			Fall of rain.	Remarks.
July.	Sunrise.	Noon.	Sunset.		
	deg.	deg.	deg.		
1st	76	88	90		
2nd	75	82	88		
3rd	73	80	82		
4th	72	79	84		
5th	73	81	81		
6th	71	79	84		
7th	73	85	90		
8th	74	85	87		
9th	70	84	87		
10th	72	83	88		
11th	73	85	89		
12th	72	85	87		
13th	73	87	89		
14th	75	88	87		
15th	74	87	86		
16th	73	83	71		
17th	66	72	72		
18th	68	70	68		
19th	65	74	79	4 inches.	
20th	72	77	72	2 "	
21st	72	72	71	3.5 "	
22nd	69	69	72	1.5 "	
23rd	68	72	71		
24th	69	72	74	1 inch.	
25th	72	82	79		
26th	72	74	84	2 inches.	
27th	72	76	83	1 inch.	
28th	77	79	84	5 inches.	
29th	68	78	82	2.5 inches.	
30th	70	72	78		
31st	69	69	68	1 inch.	

*Mean Temperature in the shade from 1st to 31st July 1860.*

Sunrise.	Noon.	Sunset.	Remarks.
deg.	deg.	deg.	
71 $\frac{17}{31}$	79	80 $\frac{37}{31}$	

*Maximum Temperature in the shade from 1st to 31st July 1860.*

Sunrise.	Noon.	Sunset.	Remarks.
degrees.	degrees.	degrees.	
77	88	90	

*Minimum Temperature in the shade from 1st to 31st July 1860.*

Sunrise.	Noon.	Sunset.	Remarks.
deg.	deg.	deg.	
65	69	68	

Total fall of rain from the 19th to 31st July—19 inches.

*General Remarks for July.*

. The same as last month. Thunder storms were pretty common among the surrounding hills—some of them approached close to the station. The air was not so clear as during the previous month, there being frequent mists and clouds. The atmosphere was also more oppressive until the rains commenced—very little rain fell until the night of the 18th, when the rains may be said to have commenced. A loud report was heard on the 14th, ascertained to have been due to the exploding of a meteor near Dhurmsalla. The rains at their commencement were severe and

continuous, but after a little changed into showers of various severity and duration. During the intervals of showers, mist clouds often passed over the station. The temperature was considerably reduced by the rains.

The wind was chiefly southerly during the first half of the month ; northerly and variable during the latter half.

*Register of Temperature in the shade and open air, and fall of rain for  
August 1860.*

Date.	Temperature in the shade.			Temperature in the open air.			Fall of rain.		
August.	Sunrise.	Noon.	Sunset.	Sunrise.	Noon.	Sunset.	Sunset to Sunrise.	Sunrise to Sunset.	Remarks.
	degrees.	degrees	degrees	degrees	degrees	degrees			
1st	66	74	65	66	80	69	·3 inch.	2·5 inches.	
2nd	69	69	68	72	66	66	·1 do.	·4 inch	
3rd	65	75	65	63	73	61	·8 do.	1·2 inches	
4th	65	66	64	61	69	58	·13 do.	1·1 do.	
5th	69	78	80	65	80	86	·1 do.		
6th	74	73	69	73	69	64			
7th	65	75	63	61	69	61		·5 inch.	
8th	64	64	71	62	70	64	1·1 inches.	·9 do.	
9th	69	70	67	65	69	63		·1 do.	
10th	66	71	69	61	74	63	·1 inch.		
11th	67	70	68	68	66	63	1·2 inches.	·1 do.	
12th	67	77	70	63	80	68		·1 do.	
13th	68	70	69	65	63	63	1 inch.	1·8 inches.	
14th	61	69	71	57	71	61	2·6 inches.		
15th	66	68	67	59	74	63	·4 inch.	·8 inch.	
16th	66	78	69	69	75	64			
17th	68	78	68	63	79	65			
18th	67	79	70	61	80	67	1·2 inches.		
19th	68	74	69	61	76	66	·1 do.		
20th	67	76	72	63	73	70			
21st	65	70	66	62	69	63	·2 inch.	2·4 inches.	
22nd	64	69	69	61	67	67	1·3 inches.	·5 inch.	
23rd	66	72	66	64	68	63	·2 inch.	·5 do.	
24th	63	66	64	60	64	63	2·1 inches.		
25th	63	68	65	61	67	60	·5 inch.	·3 do.	
26th	62	77	66	59	76	59			
27th	61	74	67	57	78	64			
28th	64	78	68	59	74	62			
29th	65	76	67	60	79	64			
30th	65	76	75	60	76	64			
31st	64	73	72	62	81	65			

*Mean Temperature in the shade and open air from the 1st to 31st  
August 1860.*

Shade.			Open air.			Remarks.
Sunrise.	Noon.	Sunset.	Sunrise.	Noon.	Sunset.	
degrees	degrees	degrees	degrees	degrees	degrees	
65 $\frac{2}{3}$ $\frac{1}{1}$	75 $\frac{1}{3}$ $\frac{1}{1}$	68 $\frac{1}{3}$ $\frac{1}{1}$	62 $\frac{2}{3}$ $\frac{1}{1}$	76	64 $\frac{1}{3}$ $\frac{5}{1}$	

*Maximum Temperature in the shade and open air from 1st to 31st  
August 1860.*

Shade.			Open Air.			Remarks.
Sunrise.	Noon.	Sunset.	Sunrise.	Noon.	Sunset.	
degrees	degrees	degrees	degrees	degrees	degrees	
74	79	80	73	81	86	

*Minimum Temperature in the shade and open air from 1st to 31st  
August 1860.*

Shade.			Open Air.			Remarks.
Sunrise.	Noon.	Sunset.	Sunrise.	Noon.	Sunset.	
degrees	degrees	degrees	degrees	degrees	degrees	
61	64	63	57	64	58	

Total fall of rain during the month—24.6 inches.

*General Remarks for August.*

August was on the whole a pleasant month. There were generally showers at noon and during the night. The sun often showed at rising and setting, but was obscured by clouds or mist during the day. Lightning was common at night, and thunder among the surrounding hills. The sky at sunset was often magnificent. The air did not feel nearly so damp as during the latter part of July. The temperature was pleasant. The prevailing winds were north and south, sometimes variable and

gusty. The rains ceased entirely on the 25th and left the atmosphere hazy, but not at all oppressive.

*Register of Temperature in the shade and open air, and fall of rain for  
September 1860.*

Dates.	Temperature in the Shade.			Temperature in the open air.			Fall of rain.		Remarks.
Sept.	Sunrise.	Noon.	Sunset.	Sunrise.	Noon.	Sunset.	Sunset to Sunrise	Sunrise to Sunset.	
	degrees	degrees	degrees	degrees	degrees	degrees			
1st	67	80	74	60	76	64			
2nd	64	73	67	62	83	64			
3rd	65	69	69	64	69	62			
4th	63	74	65	59	83	60		.26 inch	
5th	58	65	65	51	71	60	.2 inch	.5 do.	
6th	62	68	72	57	87	63			
7th	61	68	68	58	72	59			
8th	63	70	69	61	86	62			
9th	61	74	69	58	86	60			
10th	62	70	68	56	81	60			
11th	64	74	72	58	80	63			
12th	64	69	72	59	75	62			
13th	63	72	68	59	82	62			
14th	64	71	69	62	75	62			
15th	63	71	67	62	83	63			
16th	64	71	60	63	84	59		1.32 ins.	
17th	62	69	59	60	75	58		.5 inch	
18th	59	69	60	56	78	58			
19th	58	64	59	57	71	58	.2 inch		
20th	57	67	59	54	82	58	.3 inch		
21st	59	67	64	57	70	59			
22nd	61	71	64	60	87	63			
23rd	62	70	58	60	85	56			
24th	59	69	63	58	83	60	.15 inch		
25th	61	71	64	56	85	62			
26th	60	69	66	56	78	62			
27th	59	67	64	58	86	62			
28th	58	69	62	57	83	59			
29th	59	69	62	55	80	58			
30th	59	66	63	53	82	59			

*Mean Temperature in the shade and open air from 1st to 30th September 1860.*

Shade.			Open Air.			Remarks.
Sunrise.	Noon.	Sunset.	Sunrise.	Noon.	Sunset.	
degrees	degrees	degrees	degrees	degrees	degrees	
61 $\frac{11}{36}$	69 $\frac{26}{36}$	65 $\frac{11}{36}$	68 $\frac{7}{36}$	79 $\frac{27}{36}$	62 $\frac{17}{36}$	

*Maximum Temperature in the shade and open air from 1st to 30th September 1860.*

Shade.			Open air.			Remarks.
Sunrise.	Noon.	Sunset.	Sunrise.	Noon.	Sunset.	
degrees	degrees	degrees	degrees	degrees	degrees	
67	80	74	63	87	64	

*Minimum Temperature in the shade and open air from 1st to 30th  
September 1860.*

Shade.			Open air.			Remarks.
Sunrise.	Noon.	Sunset.	Sunrise.	Noon.	Sunset.	
degrees	degrees	degrees	degrees	degrees	degrees	
57	61	58	51	70	56	

Total fall of rain during the month—2·05 inches.

*General Remarks for September 1860.*

During the early part of this month the atmosphere was hazy and occasionally rather oppressive at noon. The mornings and evenings began to get somewhat chilly. Several slight showers occurred—at the same time snow fell on the snowy range. The air was comparatively free of clouds and there was no mist. The dew at night was often heavy. The wind was variable but on the whole mild. A severe thunder storm passed over the station on the 16th, and was followed by strong gusts of wind from the north, heavy rain, and large hail stones.

The air towards the end of the month cleared up and the plains and snowy range could be seen distinctly.

Intermittent fever was common among the inhabitants of the low lying villages, but was of a mild type. The health of the European residents remained good.



*Register of Temperature in the shade and open air, and fall of rain  
for October 1860.*

Dates.	Temperature in the shade.			Temperature in the open air.			Fall of rain.		Remarks.
	Sunrise.	Noon.	Sunset.	Sunrise.	Noon.	Sunset.	Sunset to Sunrise.	Sunrise to Sunset.	
Oct.									
	degrees	degrees	degrees	degrees	degrees	degrees			
1st	56	65	60	51	80	57			
2nd	57	67	61	55	77	58			
3rd	57	65	63	54	85	58			
4th	60	69	62	56	86	58			
5th	57	67	61	53	79	57			
6th	56	64	62	55	78	56			
7th	56	65	60	50	80	54			
8th	56	65	60	51	85	56			
9th	57	64	61	56	80	58			
10th	56	66	62	56	83	59			
11th	56	64	62	51	85	58			
12th	56	64	60	54	84	57			
13th	58	65	58	54	80	56			
14th	56	62	58	50	81	56			
15th	54	61	57	52	83	54			
16th	55	60	57	53	85	55			
17th	56	62	56	53	79	54			
18th	53	60	57	49	87	55			
19th	55	61	56	49	84	55			
20th	53	60	55	53	80	53			
21st	53	60	54	49	80	53			
22nd	51	60	54	45	78	52			
23rd	53	60	54	50	77	52			
24th	51	59	55	47	87	51			
25th	50	60	52	49	80	49			
26th	49	59	53	46	67	52			
27th	48	58	53	48	69	51			
28th	50	59	53	46	72	49			
29th	50	60	53	50	71	50			
30th	49	57	53	47	71	48			
31st	53	60	54	50	71	50			

*Mean Temperature in the shade and open air from 1st to 31st October 1860.*

Shade.			Open air.			Remarks.
Sunrise.	Noon.	Sunset.	Sunrise.	Noon.	Sunset.	
degrees.	degrees.	degrees.	degrees.	degrees.	degrees.	
54 $\frac{1}{3}$ $\frac{1}{1}$	62 $\frac{6}{3}$ $\frac{1}{1}$	57 $\frac{8}{3}$ $\frac{1}{1}$	51 $\frac{1}{3}$ $\frac{1}{1}$	79 $\frac{1}{3}$ $\frac{5}{1}$	54 $\frac{7}{3}$ $\frac{1}{1}$	

*Maximum Temperature in the shade and open air from 1st to 31st October 1860.*

Shade.			Open air.			Remarks.
Sunrise.	Noon.	Sunset.	Sunrise.	Noon.	Sunset.	
degrees.	degrees.	degrees.		degrees.	degrees.	
60	69	63	56	87	59	

*Minimum Temperature in the shade and open air from 1st to 31st October 1860.*

Shade.			Open air.			Remarks.
Sunrise.	Noon.	Sunset.	Sunrise.	Noon.	Sunset.	
degrees.	degrees.	degrees.	degrees.	degrees.	degrees.	
48	57	52	45	67	48	

Total fall of rain during the month—Nothing.

*General Remarks for October 1860.*

This was certainly the most enjoyable month of the season. The air was clear, dry, and bracing; the temperature at all times pleasant. No

storm occurred, and the breezes were mild, northerly in the morning and southerly after noon. During the last week the grass in many places was covered with hoar frost, and the little pools of water on the top of Pukrota frozen over in the mornings. Snow could also be seen falling on the snowy range on the 31st; the sky about Dalhousie remaining quite clear.

### *Prevailing Diseases.*

The health of the visitors to Dalhousie was remarkably good, and any complaints that did occur were of a trivial nature, and such as are of common occurrence in the most favorable climate.

The natives living on the same level as Dalhousie are healthy, and doubtless would be more so did they not crowd so much together in the unhealthy hovels they occupy, and were they more cleanly in their habits.

Many natives called for advice, some of whom were afflicted with grave diseases, such as phthisis, pulmonalis, calculas, vesicle, rheumatism, &c.

The subjects of these complaints were beyond the middle age of life; and as far as I can recollect the only serious chronic case affecting a young person was that of a boy about 12 years of age, who was suffering from caries of the great trochanter of the right femur, following an injury received there.

During the latter part of August and early part of September, several people affected with intermittent fever came from the valleys, but no cases occurred so high up as Dalhousie. The fever was of a mild character and yielded readily to quinine; catarrh and diarrhoea of a mild type were common among the native servants during the latter part of September; both due, no doubt, to their not guarding against the alternations of heat and cold. I noticed a good many skin diseases of the scaly and pustular type, and probably these were due in a great measure to the want of cleanliness in those affected.

I did not notice a single case of goitre in Dalhousie or its neighbourhood. This disease is prevalent at Noorpore and the adjacent valleys.

From the foregoing remarks I think it is but just to conclude that as far as Dalhousie itself is concerned, no station could be more favourable for invalids during the hot season. The healthy character and dryness of the climate, the bracing air, the favourable elevation, and open aspect, all recommend it as a suitable place for those requiring a change from a hot to a colder climate. The comparative dryness of the atmosphere during the greater part of the rainy season might render it a much more favourable residence for invalids affected with chronic dysentery and rheumatism, who do not appear to do well during the rainy season in those hill stations where the fall of rain is much greater, and the atmosphere accordingly more saturated with moisture. No one will deny the salutary effect of scenery on the health ; and scenery like that about Dalhousie is well calculated to exert a beneficial influence on the debilitated and plain-sick invalid. On the east are steep hills whose slopes are clothed with pines, oaks, and rhododendrons. On the west are lofty hills whose rough and rugged sides form a pleasing contrast to the sylvan beauty of the slopes on the east. On the north is the snowy range, whose snow-clad peaks excite a feeling of coolness even in the hottest weather—now at hand—now far distant, according to the state of the atmosphere.

On the south is the glistening Ravee, widening its course to the plains, and with them dissolving in the distance. Thousands of feet below are fertile valleys, with here and there a murmuring stream threading its way to the “Ravee” and “Chuckie.”

The proximity of Dalhousie to Meean Meer and Umritsur renders it a desirable Sanatorium for the invalids of Regiments stationed at those places.

The hill set apart for barracks is, in my opinion, the best that could have been selected for that purpose. It projects towards the west from the hill next to Pukrota, and has an extensive and comparatively level summit. It is clear of other hills with the exception of Kuttullugh ; but as Kuttullugh is not so high as the barrack hill, neither the breezes nor the rain are interfered with. Capable of accommodating with ease one hundred invalids, it affords advantages which the other hill does not. There is a spur running towards the south a little lower than the barrack hill, which might easily be converted into gardens, it being now partially under cultivation. On this spur I have no doubt

sufficient vegetables could be reared to supply the station. Besides, the occupation of gardening, in addition to being a matter of economy, would be beneficial to the health of the invalids.

The two chief existing objections to Dalhousie as a Sanatorium, are the scarcity of water during the dry season and the difficulty of access owing to the bad roads. Until the water is conducted into the station it would be injudicious to send many invalids there. At the same time these objections need not interfere with practically testing the place on a small scale. For that purpose I would beg to recommend that twenty-five or at most thirty selected cases be sent to Dalhousie next season. For their accommodation a wooden hut with a thatched roof might at small expense be erected, wood being procurable in any quantity at the Black Forest. The hut should face the south or south-west, and have a verandah on the south and east aspect. A hut of this description and of suitable dimensions, with a tent or two, would be quite enough to begin with; and should the station turn out well, more extensive and permanent buildings might be hereafter erected.

\* The most suitable invalids to send would be those affected with chronic dysentery and diarrhœa, chronic rheumatism, chronic hepatic diseases, and intractable cases of intermittent or remittent fever. Owing to the number of natives who applied for advice, a dispensary with a native doctor attached would not be out of place at Dalhousie.

Should a medical officer be appointed for the next season, he ought to arrive at Dalhousie in time to commence observations by the 1st of May.

It would be well also to establish a proper system of procuring supplies, as the residents at Dalhousie during the past season were often put to great inconvenience on that account.

*Memorandum from Dr. W. LINTON, Inspector General of Hospitals,—(No. <sup>82</sup><sub>10</sub>, dated Simla, the 30th March 1861.)*

WANT of time prevented my visiting Dalhousie as I had intended, but from a perusal of Dr. Davie's report I should think the establishment of a Sanatorium there would be very advantageous to the troops in the Lahore and Sirhind Divisions, particularly as the climate would appear likely to benefit cases of chronic liver and bowel complaints,

rheumatism, and obstinate ague, for all of which the present hill stations are unsuitable. I would therefore recommend the early completion of the necessary accommodation, and the selection of a small number of men suffering from the diseases I have named. They could be sent to Dalhousie under the care of a medical officer, who should after a time report as to the success of the experiment.

From the Secretary to the Government of India, Military Department, to the Quarter Master General of the Army,—(No. 1257, dated Fort William, the 29th May 1861.)

WITH reference to your letter No. 233C, of the 12th ultimo, I am desired to acquaint you, for the information of His Excellency the Commander-in-Chief, that it appears too late to take any steps this year for the establishment of a Military Sanatorium at Dalhousie; but the Public Works Department will be requested to consider and report upon the necessary arrangements for placing there 50 men, with a proportion of officers and establishments, as an experiment during the next hot season.

From Colonel A. BECHER, C. B., Quarter Master General of the Army, to the Secretary to the Government of India, Military Department,—(No. 408C, dated Head Quarters, Calcutta, the 6th May 1861.)

I HAVE the honor to inform you in reply to your Deputy's letter No. 930, dated 23rd ultimo, forwarding correspondence from the Government of Bengal, Department Public Works, regarding the establishment of a Sanatorium on the Rhotas Hill, that His Excellency the Commander-in-Chief has given it his most attentive perusal, and concurs in the opinion that the site of Rhotas Ghur is too notoriously unhealthy for occupation; but His Excellency observes the remarks and suggestions of Dr. Hutchinson, Civil Assistant Surgeon, Shahabad, relative to another portion of the same range, and Sir Hugh Rose begs most strongly to recommend that measures may be authorized for the careful examination and observation of the locality referred to, in view to testing the practicability of establishing a Sanatorium at so very convenient and useful a position of that district.

From Major F. D. ATKINSON, Deputy Secretary to the Government of India, Military Department, to the Secretary to the Government of Bengal, Department Public Works,—(No. 144, dated Fort William, the 4th June 1861.)

WITH reference to your letter No. 1447 of the 6th April last, forwarding reports on the practicability of establishing a Sanatorium on the Rhotas Hill, I am directed to observe that it has been shewn from the papers submitted, that the site indicated is too notoriously unhealthy for occupation as a Sanatorium; but as another position in the same range has been pointed out by Dr. Hutchinson, which is represented to be free from the same objection, and has, moreover, the advantage of convenient proximity to Benares, Dehree, and Dinapore, His Excellency the Governor General in Council desires that measures may be at once adopted under the orders of His Honor for testing by a series meteorological observations, the feasibility of establishing a Sanatorium in so useful a position, it being understood that the measure will not involve any considerable outlay.

From Lieutenant Colonel C. B. YOUNG, Secretary to the Government of Bengal, Public Works Department, to the Secretary to the Government of India, Military Department,—(No. 2271, dated Fort William, the 23rd May 1861.)

IN the 7th paragraph of my letter No. 2712, dated the 9th July last, it was stated that the commissioner of Assam had been desired to mention what measures, if any, had been adopted with respect to the establishment of Sanatoria for European Troops in the Cherra Poonjee Hills, and at Noormai Poonjee in particular; and I am now directed by the Lieutenant-Governor of Bengal to submit a report on the subject.

2. Colonel Jenkins, the commissioner, replied to these enquiries by forwarding copy of a report furnished by Captain Rowlatt, principal assistant in charge of the Cossiah Hills, who, having personally inspected the hilly ranges and examined the country all round Noormai Poonjee, came to the conclusion that there was no ground in that neighbourhood which could possibly be occupied as a Sanatorium for European Troops.

3. The whole country was described to be a succession of abrupt ridges and isolated hills, on any one of which there is not room to build a single house. To the south and east of the village there is a ridge about eighty yards long, but it has a width of only fourteen yards with steep slopes down to rice cultivation in the hollows below, and is quite unfitted for building a barrack capable of holding even a dozen men.

4. Captain Rowlett accordingly recommended that the Native Doctor then employed at Noormai Poonjee under the sanction conveyed in your letter No. 951 of 16th February 1860, in registering the thermometer and rain gauge, should be removed at once to Shillong, on the suitability of which place as a Sanatorium for European Troops, a committee of military and medical officers had been directed to report ; and the Commissioner added that this transfer had, under the circumstances, been authorized by him.

5. One advantage that Noormai Poonjee possesses over Cherra Poonjee is, that the rainfall is very much less at the former place. From observations taken during the three months of April, May, and June 1860, it was found that the fall of rain at Noormai was only 50.00 inches, while at Cherra Poonjee it was 259.35. And as Shillong is but eight miles south of Noormai, it will probably be found to possess equal advantages in respect of rainfall.

6. In your letter No. 656, dated the 18th June last, to the address of the Quarter Master General of the Army, the Commander-in-Chief was requested to arrange, in communication with the Bengal Government, for the appointment of a committee to examine and report upon the fitness of Shillong as a Sanatorium ; and as it appears that the committee have submitted their report direct to your office, the Lieutenant Governor thinks that he is not called upon to say any thing further on that subject at present. But to help towards a solution of the question, and for the purpose of laying all the information available before the Supreme Government, I am directed to forward copy of the letters from Colonel Jenkins the former, and Captain Hopkinson the present commissioner of Assam, together with the valuable reports which they enclose from Captain Rowlett, a member of the committee.



7. These reports, it will be seen, were not written with reference to the subject of Sanataria, but on the general question as to the best means of encouraging European invalids and pensioners, and retired non-commissioned officers and soldiers of good character to settle in India, and more particularly on the ranges of the Cossiah and Jynteah Hills. Shillong being apparently the most suitable locality in these ranges, much is said regarding it, and it is hoped that the information contained in the papers now forwarded with respect to Shillong; will not prove unacceptable at a time when the question of establishing a Sanatorium upon it is being discussed.

8. Captain Rowlatt's letters are very full and very interesting in the details of which they treat. Both he and the commission consider that the first essential to any settlement of Europeans at Shillong or thereabouts, is the location of a force of European soldiers at that place to remove all disquietude and anxiety from the minds of intending settlers (*vide* paragraph 4 of Colonel Jenkin's letter No. 92 of 16th July last.) Such being the case the Lieutenant Governor has considered it advisable to await the receipt of the committee's report from the Military Department, and of orders regarding the formation of a cantonment, before giving instructions from which any great expense is likely to arise, in surveying or road and bridge-making, which appear from Colonel Jenkin's other letter (No. 127, paragraphs 7 to 11) to be among the most essential requirements.

9. If the cantonment be sanctioned, Colonel Jenkins thinks the best approach to it will be by the Barhill River to the foot of the Hills on the south, and thence by a new road, avoiding Cherra Poonjee, direct to Shillong. Captain Rowlatt, on the other hand, thinks the best road of approach will be by steamers to Gowhatty, and thence by a road about fifty miles long *via* Nunklow on the north of the hills to Shillong.

10. In the first instance, however, the commissioner is of opinion that the Sanatorium must be reached by the present road through Cherra Poonjee, and in this there seems to be no difficulty.

11. Captain Rowlatt in the 18th paragraph of his letter No. 292 of 15th September last, asks, in order to open this road, to be allowed 1,200 rupees for a bridge over the Bogapanee River, and 1,900 rupees for making the road from Moplong to Shillong, eight miles in length, forming part of the whole line.

12. For constructing or commencing the road northwards in the direction of Gowhatty, he asks, in the 20th paragraph of the same letter, for a grant of 500 rupees, and suggests at the same time that 20,000 rupees be allotted to the officers of the Public Works Department for making that portion of the road which lies in the low lands or in the Assam valley.

13. The commissioner does not allude to, or at present support, these recommendations specifically, doubtless considering them to be premature, and in this opinion the Lieutenant Governor concurs.

14. In the year 1857, Captain Marshall, then Executive Engineer of Lower Assam, endeavoured to carry out an order for surveying and reporting upon the advantages of forming a metalled communication between Gowhatty and Nunklow, (the road just alluded to) but was obliged to lay aside the project from sickness. After him two or three other officers held charge of the division, but their stay being short and their time occupied with other matters, nothing was done during their incumbency.

15. Recent changes have however improved the aspect of affairs in Assam, and works of importance which have been neglected will now, it is expected, be more vigorously prosecuted. Amongst other matters the attention of the Superintending Engineer, Colonel Reid, has been called to this road, which has acquired additional interest from the proposed establishment of a Sanatorium upon a place so well suited to the purpose apparently as Shillong; and he was desired in January last to submit a report on the subject when next he inspected the Sylhet division.

16. A project regarding the proposed road will hereafter be submitted by Colonel Reid; but in the mean time he reports, under date the 6th April 1861, that in company with Captain Rowlatt he examined the site of Shillong, and that he thinks it admirably suited for a Sanatorium. There is plenty of fine gently undulating ground for building purposes, and a supply of spring water amounting to 300 gallons of water per minute can be obtained. The road of ascent from Moplong is very level, and two bridges only will be required.

17. The maximum temperature in the month of August last was 74°, and on the 1st February it was 34° Fahrenheit. On the 4th

March following the thermometer stood at 52° in the morning and 58° in the afternoon. The fall of rain in the year was only 142 inches as compared with 723 at Cherra Poonjee,—so Lieutenant Colonel Reid states.

18. The hill of Shillong is upwards of 6,000 feet high ; and as strong winds often prevail, it seems to the Superintending Engineer that small cottages, capable of holding ten or twelve men each, would be far better suited for the comfort of the Troops than a large barrack. Timber of sufficient size for roofs of cottages is to be had within a short distance of Shillong ; and there is such ample space on the hill top, that a small plot of land could be spared in front or rear of each cottage for gardens. There are also many fine sites to the north end of the hill for building on, with land enough for small farms.

19. The Superintending Engineer has also been engaged in exploring the best line of road to the plains, but has reported nothing definite as yet. He learns, however, from the Natives, that it is possible to reach Gowhatty in two days from Shillong, and certainly with ease in three days.

20. The Lieutenant-Governor is not aware that any thing further is required at present, but when the report of the committee is received by him, he will be glad to issue such instructions as it may seem to call forth in furtherance of a scheme, should such be approved for the establishment of a European Sanatorium upon Shillong.

From Colonel F. JENKINS, Agent, Governor General, North-East Frontier, to W. S. SETON-KARR, Esq., Officiating Secretary to the Government of Bengal,—(No. 127, dated the 24th September 1860.)

In continuation of my letters, Nos. 69 and 92, of the 14th May and 16th July, on the subject of a Sanatorium in the Cossiah Hills, and a place of settlement for European invalids and pensioners, I have the honor to submit a copy of a letter from Captain Rowlatt, Principal Assistant Commissioner, in charge of these hills, proposing

certain measures in connection with the station for European soldiers which that officer supposes will be immediately established on the site approved by a committee appointed by order of His Excellency the Commander-in-Chief with the consent of the Government of India.

2. With advertence to what Captain Rowlatt observes regarding the want of a Sanatorium for Assam, I fully agree with him, and also as the expediency of removing the civil station to the vicinity of European station; but it seems to me it will be premature to do any thing in regard to these measures until the question of cantoning a European detachment or regiment in these hills is finally disposed of.

3. Should that point be determined on, I would at once recommend that Captain Rowlatt should remove his Head Quarters to the vicinity of the new station, leaving his assistant, Mr. Shadwell, for the present at Cherra.

Captain Rowlatt's presence at Shillong would, I have no doubt, be of the greatest use in facilitating the construction of the required buildings, and laying out the roads to and from the civil and military stations, and marking out as well the allotments of land available for European settlers or persons who may determine to build in the vicinity of the new station.

4. The nearest easy practicable road to Assam, as alluded to in his 19th paragraph, should also be immediately undertaken, as on the facility with which the European station can be reached from this side, will, in great measure, depend the means of supplying the Troops cheaply with all the necessaries of life.

But with reference to supplies, Shillong will be far better off than Cherra, which draws all its supplies nearly from one direction by Terriah Ghaut, the Cossiah country, north of Cherra being for a long distance, very barren and thinly populated; whereas Shillong will be surrounded by the most populous and best cultivated districts of the Cossiah and Jynteah Hills, as well as be accessible to Assam by the *shortest possible route*, and likewise accessible from the Sylhet and Jynteah districts by other routes than that *vid* Cherra.

5. I am myself very sceptical as to the Sanatorium or Cantonments at Shillong being accessible from Gowhatty, except for four months in the year; November, December, January, and February.

Although Captain Rowlatt is very sanguine of opening a good Road *vid* Beltollah, I have great doubts on the subject, as Captain Townshend who surveyed all the routes, staid some time with me after he came down by this very route, and I know well that he was very greatly disappointed; but of course with an adequate outlay a very tolerable road may be made, as a waggon road has been carried over the Tyrolese Mountains; but whatever sort of road may be made nothing that can be done will alter the deadly nature of the country through which the road runs, and to which two allusions are made in the committee's report.

6. A good road for the Mekir traders, who inhabit that tract of low hills, may be readily made practicable for them all the year round, and a passable road for Europeans and foreigners during four or five, months of the year;—and this is a work of the most pressing importance and should be taken up the first thing without any delay; and I have no doubt that, if the work is entrusted to Captain Rowlatt, it will be done well and with utmost economy.

7. But in regard to the best means of approach to Shillong, my opinion is that we require a much more accurate topographical knowledge of the country before that question can be determined.

On the information I now possess, I am inclined to believe that the best approach to the Sanatorium will always be found to be from the south through the Sylhet district, not from the north *vid* Assam, whatever may be the facilities offered by the navigation of the Berham-pooter. The principal reason for this opinion is that by the south only can you avoid passing through malarious districts.

8. But to take the present road *vid* Cherra, and to proceed across the country through the deep chasms of the Kalapance and Bogapanec Rivers seems ridiculous, and in searching for a line of road, Cherra should be kept out of consideration altogether.

9. I beg to accompany this with a general map of the country by Mr. Oldham, which will, in some measure, be sufficient to elucidate what I would propose to call attention to. I believe that by entering on the hills farther east, somewhere beyond the Burhill River, the Cossiah Hills may be crossed without meeting with any large rivers along the plateau of the hills the whole way, and perhaps the Burhill

River may be found navigable to the foot of the hills all the year round, and be available for the transport of heavy baggage which the small nullah that descends from Terriah Ghaut to Chattuc is not, being only navigable in the rains. But the object to attain is the nearest point of the great range that is accessible from the Samooah, and from the top of which ascent a road can be carried across the hills by the easiest route, avoiding the very difficult country across the Kala and Bogapances.

10. For some time Cherra must possibly be the route pursued, but even now there is no necessity, as I know, of crossing the channel of the Bogapancee, and I am not certain that it is not possible to turn the Kalapancee also. I have been to Mohin (Moleem) without crossing the Bogapancee, or rather only one of its upper branches which was there running on the surface like a small English mill-stream. In the present map the Kalapancee by some odd mistake is laid down wrong: from Surareem it might be supposed you could pass along the ridge leaving the Kalapancee to the right hand entirely, but the river named the Kalapancee in the map is another stream; the Kalapancee lies on the left hand and runs into the Bogapancee some distance below in the south-west.

In my route to Moleem, I passed the Kalapancee and then turned to the north-east; but supposing this map to be correct, and the only error to be in affixing the name to the wrong stream, I believe it may be possible to reach Moleem and Shillong without crossing either river.

11. I believe the Government may confidently determine on establishing a station for European Troops at Shillong; but I wish to impress on the Government the imperious necessity before other steps are taken, as of making roads and bridges at a great expense, that an accurate survey of the whole country should be at once made under the superintendence of an experienced engineer, to lay down the lines of road by which the new station can most conveniently be connected with the southern plains.

From Captain E. A ROWLATT, Principal Assistant Commissioner in charge of the Cossiah and Jynteah Hills, to Colonel F. JENKINS, Agent, Governor General, North-East Frontier,—(No. 292, dated the 15th September 1860.)

The committee directed to assemble by order of His Excellency the Commander-in-Chief having now submitted their report on Shillong as a place fitted for the location of European Troops, and unanimously given it as their opinion that the proposed site is in every way suitable for the purpose required, I now do myself the honor in continuation of my report No. 106, of the 2nd May last, to submit a few propositions having for their object the establishment of a Civil Sanatorium also at Shillong, a place of resort for invalids of all classes, or those whose avocations in the plains of Assam or throughout the Eastern frontier generally would admit of their residing occasionally in the hills.

2. The want of a Sanatorium accessible at all times of the year has always been felt most severely by the people of Assam. Up to the present time all that any one falling ill can do, is either to get into a boat or steamer and proceed at once down to Calcutta, for the purpose of going to sea or England; for the difficulty and length of time required to reach Cherra Poonjee or Darjeeling is so great that few have even attempted it. It may truly be said that a person falling sick in Assam must either remain there at all hazards or leave the country.

3. But great as the want of a Sanatorium within reach of Assam has hitherto been felt, it is undoubtedly the case that this want will go on increasing most rapidly; for, formerly there were comparatively but few European residents there, whilst now from the great success which has attended the cultivation of Tea, the European population has already become extensive, and may certainly be expected to increase very considerably. I therefore say that it is a matter of the utmost importance to the people of Assam that some place should be made available as a Sanatorium to which they might resort without having to incur great expense, and situated within a moderate distance.

4. The committee in their report have stated that there is room at Shillong for two, if not more European Regiments; but besides the space alluded to in their report, there are plenty of places ad-

mirably adapted as sites for at least fifty single houses which are not included in the ground they have selected for a European cantonment. There is therefore no want of room at Shillong itself, but in addition to the table land under Shillong, there are many other localities close at hand which are perfectly notable for occupation, such as the opposite heights of Dingaie, the slopes leading down to the table land of Yeodo, the high ground to the east of Yeodo, and the plateau of Yeodo itself, which is not less than 12 square miles in extent, and about 5,000 feet above the sea level, and plentifully supplied with water.

5. As a resort for invalids and a retreat for the European residents of Assam, who might, during a portion of the year, be able to leave the plains to recruit their health in the hills, the Shillong Sanatorium would, I am convinced, prove highly attractive and very beneficial. The scenery in all directions is of the most varied and picturesque character, and the view from the north-east end of the table land can scarcely be surpassed in grandeur, for, from this point the eye ranges over the whole of the intermediate hilly country towards Assam, whilst the valley of Assam is spread out like a map before the observer, the plain being divided by the line of the mighty Berhampooter River, and the distance terminated to the north by the endless chains of the Himalayan Mountains, capped by peaks and ranges of perpetual snow.

6. The climate of Shillong and the immediate neighbourhood is undoubtedly as good as can be

At Cherra Poonjee.	Noormai Poonjee.
April ... 75·18	... 10·20
May ... 70·80	... 12·30
June ... 113·37	... 27·50
July ... 106·91	... 17·90
August 101·91	Shillong 40·90
<hr/> 570·50 <hr/>	<hr/> 108·70 <hr/>

found in these hills; the site is as near as possible equi-distant from the plains on either side, and therefore as far removed from malarious influences as it is possible to be; there are no heavy

forests, swamps, or jungle, within a distance of twenty miles, and the rain which falls so incessantly at China is here comparatively trifling; as it has now been ascertained by actual measurement by pluviometers kept at Cherra Poonjee and Noormai Poonjee from April to July, and during August at Shillong, that whilst the number of inches registered at the former place has amounted to 570·53, the quantity falling at the two latter has only aggregated 108·70.



7. The village of Noormai, I may mention, is only 12 miles distant from Shillong; and as both places are situated in the very centre of the hills, there only being a difference of six miles between them in latitude, the observations made at one, are for all practical purposes applicable to the other. I may, however, state that the pluviometer at Noormai was placed under the lee of a hill, and that it is commonly reported that more rain falls in proportion in the interior of the hills towards the latter than is the case during the early part of the rains; this will account for the monthly fall of rain having apparently been less at Noormai than at Shillong. Had, however, the instrument been fairly placed at the former, as it was at the latter place, and been kept at each for the same months, very little difference would, I think, have been shown. It may be safely calculated that not more than one-fourth the rain falls in the central ranges of these hills on which Shillong is situated than is the case at Cherra Poonjee; and as that which does fall, does so chiefly at night and during the warm months, there being little or none in the cold weather, the quantity of rain falling at Shillong will never, I believe, prove annoying or detrimental to health.

8. Unlike most hill stations the country around Shillong is so gently undulating, and free from deep chasms, that in most directions no obstructions exist to the free indulgence on horse or foot exercise. All that is required is a common pony for those who prefer riding, to enable them to roam over the country for miles and miles. The wild flowers that cover the hills at all seasons are very beautiful, and good fishing would be found in the Oomean, which runs under the north-west side of the plateau.

9. These particulars I mention, as splendid scenery, pleasant rides and walks and amusement to be derived from botanizing and fishing, &c., all assist to make a locality an agreeable place of residence, and conduce materially to the restoration of health.

10. The only doubt expressed by the committee in their report refers to the supply of water. At the present season there is of course no scarcity, but it is thought advisable that the stream of water running through the table land under Shillong should be examined again in February next, although I myself had seen it in April, and found it then contained a good supply. They observe that previous to my

going there some rain had fallen, so that I had not seen it at the time when it may have contained less water. On this point, however, I have no doubt myself, because I carefully inquired from the Natives of the place whether the stream in question ever dried up, and they all assured me that it never did, but on the contrary always contained a good supply of water.

11. Should it however eventually be determined on this or any other account not to send European Troops to Shillong, I trust that whether such Troops are sent there or not, that the great importance of establishing a Sanatorium there for the province of Assam will not be overlooked, but that this proposition will meet with a favorable reception.

12. I beg to take this opportunity also to advocate the advisability of removing the place of residence of the principal assistant in charge of these hills from Cherra Poonjee to Shillong; for if once taken up as a Sanatorium, it is certain within a very short time to become the most important place in these hills. It is also far more central than Cherra Poonjee, which is very inconveniently situated for access by the majority of the people of the district, being only 10 miles from the southern boundary, but 74 from its northern limit.

13. Should this be approved of, I beg to state that I am prepared to move out to Shillong whenever directed to do so. At Cherra there are no Government civil buildings of any kind whatever except the Jail, which has just been condemned, and a new one ordered to be constructed, so that the removal of the chief civil station to Shillong will not entail on the Government much loss.

14. For some time at least it will of course be necessary to keep up Cherra as a civil station. The removal to Shillong I would propose to effect gradually; and should it hereafter be found necessary, Cherra could be kept up as a sub-divisional station, which would secure it for the resort of such of the people of Sylhet and Cachar, who might think Shillong too far off to visit for short periods.

15. I think that it must be allowed that before Troops are stationed at Shillong, or any parties could be found willing to build houses there, that some little progress should have been made in opening out the communications with both Cherra and Gowhaty; also that a few station roads be constructed, a bazar collected, and such other

arrangements completed, as would facilitate access to the station, and provide the means of living there when it is reached.

16. This it appears to me can only be done by an officer being deputed there, who would commence by building a house for himself; thus, if assured, that the site will be permanently occupied as the Head Quarters of the district, I am willing to do; and in addition to my other duties I could also superintend the construction of the roads and bridges in and leading to the station, if funds were placed at my disposal for the purpose.

17. These works could be constructed either on my own entire responsibility or under the supervision of Colonel Reid, the Superintending Engineer of this Circle.

18. From Cherra to Shillong all that would be required at present is, that a bridge in lieu of the suspension bridge carried away in 1851 should be built over the Bogapanee under Moflung, to whence from Cherra the road is otherwise in excellent order. This bridge I propose to construct on the plan of that forwarded with the Circular of the Secretary to the Government of Bengal, Public Works Department, of the 30th March last. It would probably cost about 1,200 rupees; and as the distance from Moflung to Shillong is only eight miles, and the ground nearly level the whole way, 200 rupees a mile, and 300 rupees for a bridge of stone over the small stream that is met with about half way between these two places, or rupees 1,900 in addition to the rupees 1,200 for the Bogapanee bridge, would enable me to complete the communication from Cherra to Shillong.

19. For the road to Gowhatty I would propose, that as soon as the rainy season is well over, that I be permitted to mark out a line to the foot of the hills south of Gowhatty, and that the Superintending Engineer be instructed to report on it, send in his plans and estimates. When the work might be commenced on without delay if thought expedient, I might be directed to undertake the construction of the road from Shillong downwards, whilst it was commenced on at the same time from Gowhatty;—in this way we might work on until both ends meet.

20. As some expense will have to be incurred in marking out the road, I would solicit that a sum of rupees 500 be placed at my

disposal for this purpose, and also that an advance of rupees 20,000 be made to the Department of Public Works on account of this road, to be adjusted hereafter, which would admit of the work being proceeded with at once.

21. There can be no doubt but that the success of Shillong as a Sanatarium will mainly depend on the ease with which it can be reached from Gowhatty ; and from all I have learnt, and from having been able when there, on several occasions to examine the country with the telescope right down to the plains, a distance of only about thirty-seven miles, there appear to be no difficulties in the way of a carriage road being made the whole way up, and at a very moderate expense. There are no high ridges to be crossed, and only one stream of any size, and the whole distance by the road, when completed, will certainly not exceed fifty miles. There is no reason whatever why Shillong should not be reached from Gowhatty in light carriages in one day.

22. As a place of debarkation, Gowhatty is very happily situated ; it is nearer the base of the southern range of hills than any other station in Assam, and the river being confined between rocky banks cannot change its course ; it is the chief station in the province and very fairly supplied with all the requisites of civilized life. The roads and houses are good, and the shops tolerably well supplied with articles likely to be required by travellers, so that parties arriving at Gowhatty and intending to proceed on to Shillong would disembark at a place well suited as a starting point from whence to commence the land journey.

23. To Gowhatty steamers of the largest size can go all the year round ; as soon therefore as the road is completed Shillong will be approachable within one day's journey by water from all directions, an advantage not enjoyed by any of the other hill stations in India. A good steamer should reach Gowhatty in eight days from Calcutta going direct, which they can do in the rains *viâ* the Jellinghee or Matabanga, the Pubna River and Jamoona Sootec into the Berhampooter at Serajgunge, and then straight up to Gowhatty. It has been done by the steamer *Jumma* single handed *viâ* Dacca in eleven days. From Dacca a steamer ought not to take more than five days to Gowhatty, so that with proper arrangements Shillong could always

be reached from Calcutta during the rains in nine days *vid* Dacca, for the rest of the year in twelve, and from Dacca in six ; whilst from all the stations in Upper Assam, as it is down-stream the whole way, the time occupied would vary from two to five days according to the distance the station of departure might be above Gowhatty.

From Colonel F. JENKINS, Agent to the Governor General, North-East Frontier, to  
C. U. AITCHISON, Esq., Under-Secretary to the Government of India,—(No. 92,  
dated the 16th July 1860.)

With reference to your Circular No. 1602 of the 31st May last, and accompaniments, on the subject of encouraging non-commissioned officers and soldiers of good character to settle in India, I have the honor to forward a copy of a letter from Captain Rowlatt, Principal Assistant Commissioner in charge of the Cossiah and Jyuteah Hills, reporting on the subject in question.

2. The tract of hills under Captain Rowlatt's charge seems to be the only district in this Circle where there could be any chance of settling Europeans with a prospect of successful results ; that is, where they would find a congenial climate in which they might have comparative health and comfort, and be able to exert their energies in introducing the agriculture and trades of Europe to their own profit and the improvement of the country. I have therefore considered it unnecessary to call upon the other assistants to make similar reports.

3. Captain Rowlatt relates at considerable length on the fitness of certain portions of that hill country for the purposes required, and the means of effecting European settlements with the assistance of the Government ; but in the 37th paragraph he adverts to what he considers the absolutely necessary preliminary to ensure success, *viz.*, the cantonment of a body of European troops in some central spot in the hills.

4. This also seems to myself so essentially necessary in the first place, that I am of opinion it is scarcely necessary to entertain the immediate subject of your letter until something has been done to remove all disquietude from the minds of intending settlers by locating a party of Europeans, invalids of a detachment from a European regiment in some well selected site within the hills.

In that paragraph Captain Rowlatt particularly alludes to the neighbourhood of Shillong as offering very great advantages for a European cantonment ; and I beg to mention here that Captain Rowlatt lately made a special report on that district in a letter No. 106 of the 2nd May 1860, which was forwarded to the Government of Bengal with mine, No. 69 of the 14th idem.

5. In the 49th and concluding paragraph of his letter, Captain Rowlatt suggests the expediency of establishing a Government experimental farm within the limits of the central division of the hills, and I would beg to call attention to his suggestions.

In my opinion some measure of this nature is requisite before Europeans will be satisfied with the capabilities of the hills ; but it is a matter of some difficulty to know how it might be most efficiently and economically carried out ; and I am inclined to think the best means of ascertaining the capabilities of the hills would be to establish a village of selected European invalids with their families, giving each small tracts of land to farm, and assisting them, besides their pensions, with certain sums to buy the necessary cattle and implements, grain and poultry, to enable them to commence their farms and construct their houses.

The experiment to be made effectually will involve a considerable expense to Government, but there seems no other method of ever adopting this fine hilly country to the purpose of European colonization.

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From Captain E. A. ROWLATT, Principal Assistant Commissioner in charge of Cossiah and Jynteah Hills, to the Agent to the Governor General, North-East Frontier.  
 --(No. 209, dated the 6th July 1860.)

I have the honor to acknowledge the receipt of your memorandum No. 266, of the 11th ultimo, forwarding a correspondence on the subject of encouraging retired non-commissioned officers and soldiers of good character to settle in India, on which I am called upon to report.

2. The subject to which this correspondence refers is doubtless one of great importance, both in a political and social point of view ; for the settlement of Europeans of good character throughout the

country generally must certainly add materially to the stability of our Government, and tend quicker than any other means that can be employed to develop its manufactures, agriculture, and commerce.

3. But however desirable it may be that Europeans should settle throughout the country generally, it must, I think, be patent to all, that the plains are not so well adapted for the settlement of Europeans of little or no capital as the hills. In the plains the European settlers can only succeed as directors of capital or employers of labor. They require spacious houses, the luxury of numerous servants, carriages, buggies and horses, their children have to be reared in England or in the cooler climate of the hills; they are in fact delicate exotics who can only be kept alive by the greatest care and at considerable expense, and even then rarely enjoy robust health, and are frequently driven away from their employments to seek renovation to their wasted frames at some far off Sanatorium or in the still more distant land of their birth. Now all these requisites are unattainable to persons of small means; if they fall ill or their sickly children pine away, there they must remain and die. I therefore say that for people of the poorer classes, the plains offer fewer advantages than they do to persons of greater wealth, for the climate being ill suited to the European constitution, settlers in the plains are unable to do without those comforts and expensive concomitants which alone makes a residence there at all tolerable.

4. In the hills, on the contrary, such is not the case, the climate being healthy and cool, the European would be able to engage in outdoor work; he might plough and perform other agricultural acts, or work as a manufacturer without danger to his health. The digestive organs being in good order, substantial but coarse food would be all he would require; and instead of being a burden to him which she is in the plains, his wife might attend to the dairy and do all kind of household-work without the certainty of sickness being the inevitable result; then again his children would grow up healthy and strong: he would not lose four out of five from the effects of the climate, which is the case in the plains, and instead of being a constant source of anxiety and expense, a family as they grew up would be of the greatest assistance to the settler, and add very much to his property.

5. Such being the case, it is obviously highly desirable that as many of the poorer class as possible, who have settled in the plains should be rescued from a position where they never can thrive—as to increase that seems out of the question; for if confined to the plains, European settlers would usually become extinct in three generations, whilst if colonies were planted in the hills, they doubtless would on the contrary rapidly multiply.

6. Without some assistance, however, it is manifest that people of this class could not establish themselves in the hills, it therefore becomes necessary to consider what this assistance should consist of, and how it may be best afforded.

7. The difficulties the colonist would have to contend with would, I think, always be greatest at the commencement of his career. The expense of removing to the hills and establishing himself there would be more perhaps than most could manage to meet, but after the first difficulties were got over, and crops and cattle began to accumulate, no further aid ought to be required; for if after a fair start a colonist is unable to maintain himself, it must either be that he is unfitted for the position he has assumed, or that the attempt to people the hills with Europeans will not succeed: in the first case he could not, beyond the pension he is entitled to, expect to receive continued aid from the state, and that the latter is not likely to be the case, I hope in the sequel to be able to show.

8. The assistance therefore which I would propose to afford to retired non-commissioned officers and privates of good character is to pay the whole of their expenses of removing from the place they may be residing at to wherever they may wish to settle, and to advance to each settler, if required, a sum not exceeding 300 Rupees, to enable him to build a house and commence the cultivation of a grant of land, which should be given to him on the same terms as to other parties.

9. These grants should, I think, be limited to 100 acres, and the advance be re-payable in ten years without interest.

10. Assistance to this extent ought, I think, to be a sufficient inducement to any man to settle in these hills who has the will to work and the desire to better himself; those who have not, had better



stay away, for there are here but few ways of making a livelihood or adding to a man's means of subsistence except by the exercise of honest industry and well directed exertion.

11. But it will be asked what are the inducements to settle in the Khasseah Hills?—what is the country, its soil and climate like?—are the people savages or civilized?—and what facilities does it offer for farming trade, and the establishment of manufactories?

12. These questions I propose to reply to in the following paragraphs, and first as to the country.

13. The Khasseah territory is a part of a range of hills which run nearly east and west, commencing not far from Mymensing in Bengal and stretching away into the far east, where they join on to the ranges separating British India from Burmah and the Chinese Empire to the west. The Cossiah Hills are bounded by the Garrow country of which very little is known; to the east is North Cachar, now a British possession inhabited by Kookess, Meekcers, and Nagas, on the south lies the populous and fertile valley of Sylhet, and on the north the flourishing districts of Kamroop and Nowgong in Assam.

14. From the Garrow Frontier to North Cachar the distance is about 100 miles; the average width of the Cossiah Hills, north to south, may be put down as fifty-five miles, so that the whole area comprised in the limits above mentioned amounts on a rough calculation to 5,500 square miles.

15. The country generally may not inappropriately be divided into three great divisions: the broken rugged portion facing the south and bordering on Sylhet, which is rich in excellent coal and limestone beds; the centre which is the highest, and contains large tracts of beautifully undulating country and extensive table lands admirably adapted for the purposes of agriculture; and the northern slopes facing Assam, which are mostly covered with magnificent forests and possess very fine soil.

16. On the Sylhet border the hills rise abruptly from the plain and are a good deal cut up by deep valleys whose sides are steep and often precipitous. These valleys do not extend very far into the hills, but it is chiefly in these that all the limestone and coal are found, and

which from being situated in these localities are easily got at from the plains of Sylhet, the valleys affording fair facilities for working and removing them. It is along this border also that all the betel-nut, pan-gardens, orange groves, and orchards of jack fruit and pineapples, are situated, which have proved such a mine of wealth to their proprietors.

17. The villages in this division of the country are pretty numerous, especially in the neighbourhood of the Sylhet district, and the population which is all Khasse, is accordingly extensive; but from such frequent contact with the people of the plains they have lost a good many of their distinctive characteristics, and in appearance and speech are now more like Bengalees than true Khasseahs.

18. The only Rajah throughout the hills with whom no agreement exists for securing waste lands for the use of colonists, is the Cherra Poonjee Rajah; and in his district, which is all situated on the southern division, there is not, as elsewhere in this part of the hills is also the case, much land procurable of a good quality.

19. The soil in the southern portion of the hills is in fact usually very poor, and the climate from the excessive quantity of rain that falls, is far inferior to that in some other parts of the range. The temperature of the air is however cooler than might be expected, but this is a good deal more owing to the great dampness of the atmosphere than to the elevation of the hills in this direction, which cannot be put down as much more than 4,000 feet above the level of the sea. The station of Cherra Poonjee is situated in this division of the hills, but is not much frequented as a Sanatorium, although it can easily be reached in one day from the plains, and is by no means an expensive place to live at; its wants of success as a Sanatorium must be attributed to its low elevation, for it is only 4118 feet high, and to the immense quantity of rain that falls. The fact is that this whole division is unfit for such a purpose and quite unadapted for colonization by Europeans, but the trade in lime, coal, oranges, potatoes, &c., might, I have no doubt, be largely increased, and the manufacture of iron, especially at Nankradeen in Khyrum, where coal and iron with lime close at hand for a flux, are found near together, might, I feel sure, be successfully undertaken.

20. At present the whole of the iron made in these hills is melted with charcoal; it is of good quality, but the distance they have

to bring their fuel from, and the miserably inefficient furnaces they use, makes it anything but a profitable trade. All the toil expended in this way is in fact so much labor thrown away, but if proper blast furnaces were set up and worked on the European plan, the result would certainly be quite different.

21. The centre tract of country in these hills may be set down as averaging twenty miles in breadth. It extends the whole length; and as this central division is admirably adapted for the location of European colonists, we may say that there are 2,000 square miles of hilly country exactly fitted for the purpose required.

22. In this tract of country there are of course considerable variations of altitude, but the average height cannot be put down as less than between 5,000 and 6,000 feet; there are points above 6,000 feet high, but the villages which however are neither numerous nor deep are of course somewhat lower than the level of the surrounding country, In climate this part of these hills is vastly superior to that of any other portion; it is far drier and cooler than either of the other two divisions, and in the cold weather is very bracing and invigorating.

23. The soil though not so rich as that of the plains is decidedly good, especially for so high a hilly tract. It is not every where the same, but varies with the nature of its rocks: in some places the soil is stony but in others quite free from such impediments to cultivation and of considerable depth. The best potatoes in the country are grown in this central division of the hills, and wheat, barley, oats, also carrots, turnips, maugul, warzil, beans, pease, and all other kinds of European vegetables and some fruits would doubtless thrive and yield ample returns. Tea and coffee would also answer well, though the return would probably not be so great as in the lower range of hills towards Assam.

24. The country being very open and comparatively free from destructive wild animals, is exceedingly well suited for the rearing of cattle and breeding of sheep. All through this part of the country the horned cattle are remarkably fine when contrasted with the poor diminutive stunted animals met with in the plains: there are also goats, fowls and pigs in abundance; and although the Khasscahs have not hitherto been in the habit of keeping sheep, there is no doubt they would thrive very well, for they do so at Cherra Poonjee, where the climate is far less favorable to them than in the interior, whereas there is abundant of

space available for sheep walks—grazing farms might also be established with every prospect of success.

25. The Native population throughout this tract, though perhaps not wealthy, do not show any signs of poverty. They are industrious and live well, and are free from all caste prejudices which is the great bane of the Natives of the plains. They are simple in their habits, but far more independent in character than the people of the plains; and although quiet and well disposed, I doubt whether they would put up with ill treatment, so that it would behove settlers to treat them kindly, as otherwise the two parties would never get on peaceably together.

26. In this part of the hills there are several extensive tracts which belong to the British Government: they possess the whole of the lands situated within the Moleem territory lying to the south and east of the Oomeum or Bogapanny River. This plot of ground is of considerable extent, and is thus alluded to by Mr. Allen in his report on these Hills;—"The elevation of Lylancot (one of the villages in this tract) according to Professor Oldham, is 5,703 feet above the sea; there is a fine table land free from jungle; the soil is of fair quality for a hilly country; and the climate which is far preferable to that of Cherra Poonjee being much less humid, is very healthy and apparently well suited to the European constitution at all seasons of the year."

27. To the east and extending as far as the boundary of North Cachar, lies the hill territory of Jynteah, which also belongs to the British Government. There is an exceedingly fine tract of country, and has some beautiful sites for farms and European colonies; the soil is richer and the cattle finer perhaps than in any other part of the hills; there is also more timber. Here the oak and fir attain to a very fair size; wild strawberries and raspberries as elsewhere are as plentiful as blackberries in England. The villages are large and thriving, and cultivation is carried on to a great extent. It has now been under British rule since 1835; and although a slight disturbance lately took place regarding the imposition of a house tax, the whole has been paid up and the country is now perfectly quiet. In extent it measures about 500 square miles.

28. But besides the Jynteah territory and some small districts such as Syung, Moflung, Mowlung, Lykseme, &c., available for settlers, arrangements have been made with the Rajahs of Marriow, Nun-klow, Mooleem, and Khyram for the allotment of lands to colonists

who might wish to settle within their territories ; and as the latter three of these districts occupy a large portion of the country in the centre of the higher ranges of the hills we are now alluding to, and are at present the most accessible and nearest to the military and civil stations of Cherra Poonjee in the hills and Gowhatty in the plains of Assam, and also to the high road connecting these two places, these districts would probably be the first occupied, and therefore a more detailed description of them will be necessary than of the other and more distant localities.

29. The Nunklow district has a population of about 8000 souls. The principal villages are Nunklow itself, Myrung, Nonai, Lyttem, Kinchee, Monther, and Nonglree. The highest ground is to be found about Myrung, the bungalow at which place is 5537 feet high, and the best lands in the neighbourhood of Nongom, Khunroot, and Kinchee. The principal crops grown are potatoes, Indian corn, gram, murroah, saffron, onions, and garlic ; rice and China millet are also grown in the hollows, and cotton in the low hills towards Assam. The only cloth made are a few cotton pieces, but iron is found in abundance at Litdom, Myngsoot, Mugrung, Mokomit Poonjee and other villages, where kodals (mattocks), mining instruments, &c., are made. The trade of this district is principally carried on with Cherra Poonjee and the Ooncha Bazar on the borders of Assam, but large markets are held every eight days at most of the principal villages.

30. The cattle consists of cows, pigs, goats, and fowls—but no implements of husbandry are used except kodals, daos, and wooden clod-breakers. An experiment is now being made to introduce sheep, for which purpose a few have been sent out to Monai. Should they thrive and increase, they will prove a valuable addition as an article of food, and also provide wool for the manufacture of blankets, which in a climate where in the winter hoar frost is common, is certainly a desideratum.

31. Small agricultural farms combined with cattle and sheep breeding, would, I should say, answer very well indeed in this part of the country ; and that intending settlers may know the terms on which lands are procurable, I quote the clause under which they could be obtained. "The Rajah must make grants of the waste lands in Nunklow upon the same terms as those that may be adopted at the time being by the British Government in granting out its own waste lands."

32. To the east of Nunklow and Syung we come to the territory of the Moleem Rajah, the south-eastern portion of which, as already observed, belongs to the British Government. In the remaining part of it there are also some excellent lands especially near Shillong and Yeodo, which latter is situated on a table land about 4500 feet high, and seven miles long by three or more broad; and arrangements have already been made with this Rajah to give up waste lands for the use of colonists, so that no difficulties are likely to occur in procuring lands for such a purpose in his territories.

33. East of Moleem and stretching across the hills from Sylhet to Assam, and as far as the boundary of the Jynteah Hill territory, lies the district of the Khyram Rajah. With this Rajah likewise arrangements have been made for the granting of jungle waste lands to Europeans or other settlers, so that here also no difficulties would be experienced on that account.

34. The territory of Khyram is of considerable extent, measuring fifty-five miles from north to south and eight from east to west, or 440 square miles, and contains within its limits some of the best lands that are to be met with in these hills. The population is not large, being not over 8000 souls, so that there are plenty of lands lying waste, available for allotment to intending settlers. From the Mungut river on the eastern boundary as far as the village of Tundrai on the west, the country is particularly beautiful. It was in the midst of this at a place called Pomriang, that Mr. H. Stainforth of the civil service, once established a farm; it was intended chiefly for the rearing of cattle and horses, but was not carried on long enough to test the capabilities of the place properly. The remains however of a very thriving Tea Plantation are still to be seen, and whatever has escaped destruction from the annual fires which spread over the hills, look vigorous, and has attained a considerable height. The site selected for this farm is really a delightful spot. The elevation of Pomriang is 1748 feet, and the ground in the neighbourhood undulates so gently that carriage roads might easily be made all round about it and carried on to some distance without meeting with any ravines or sharp declivities. There is a nice stream of water just close to where the house stood, and not being far from Shillong, where it is proposed to establish a European Sanatorium, it is one of the most desirable sites for colonists to locate themselves on that could be found.

35. There are also good lands to be met with at Thalmowkulla and all around Rablengtilla, and at elevations that would suit almost all sorts of constitutions and nearly every description of agricultural produce.

36. The principal villages in this district are Nunkrom where the Rajah resides, Nonkrodien, Norvet, Kundeah, Nongkhap, and Theyong. At the first extensive iron works are carried on, and at the second village named, good coal is procurable, but timber in this district is scarce owing to the trees being all cut down to make charcoal of for smelting the iron with. Towards the Mungut, however, some of the oaks and firs have attained to a considerable size.

37. In order to ensure the success of colonization in these hills it appears to me absolutely necessary that a body of European Troops should be located in some central spot, such as Shillong or any other place fit for the purpose. I do not say that colonists would not be safe without the protection of such troops, but there certainly would be a sense of insecurity amongst them. They would feel the want of some place to which they might look for support and assistance in case of necessity, and without which I scarcely think that many would like to venture their persons and property amongst a tribe like the Khasseahs, who, although decidedly well disposed, are nevertheless a very uncivilized race.

38. With a European station at Shillong, the districts of Moleem, Nunklow, Khyrum, and other neighbouring small states would doubtless soon be filled with colonists—farmsteads, and substantial dwellings would spring up in all directions, and what is now a comparatively uninhabited waste would ere long be changed into a populous and thriving country, filled with grain and cattle sufficient in the course of a few years to supply many of the articles of food which would be required at such a station.

39. Having now noticed what seems likely to interest intending settlers regarding the central division of these hills, I now proceed to describe the northern portion which borders on Assam, extending in length for 120 miles and having a breadth of about thirty miles.

40. This belt of country is partly inhabited by the Kasseahs and partly by Garrows, Meekeers, Lalongs, Hannas, and Kacharees. Being situated on the northern slope of the main range, it differs very materially in character from the two other divisions; it is not so much exposed to the south-westerly winds, and is damper and warmer than the cen-

tral portion of the hills. It has however a much richer soil and is generally covered with dense tree forests containing most magnificent timber in great varieties, but it is far from healthy, as fevers are very prevalent especially towards the base of the hills, where the jungle is very rank and malaria very abundant.

41. It is however in this tract of country that the most valuable products could be raised with the greatest advantage. It is admirably adapted for the cultivation of tea, coffee, cotton, lac, sugar-cane, and some spices, and there is very little doubt but that the cinchona and vanille plant would also flourish, as there are climates of great variety, with temperature, moisture, aspect, and soil of almost all sorts to be found, where with a little experience any one well acquainted with the habits of these plants would easily be able to select sites properly adapted for their growth.

42. As these forests become cleared, the country would certainly get healthier; and even in its present state as there are plenty of clear high spots scattered all through this tract of country, there would be no danger or difficulty in any one establishing himself within its limits;—but here it is only the capitalist that would succeed, for the expense of clearing heavy forest land is very great, and no European could engage in out-door labor in this portion of the hills without contracting disease.

43. Having now alluded separately to all the three divisions into which for convenience' sake I have divided the hills, I will now make some general remarks that apply more or less to the whole country, and add a few hints which I hope may be useful to intending colonists.

44. It is I think an undoubted advantage which these hills possess over most others in India that they are bounded on both sides, north and south, by rich and populous plains, inhabited by a comparatively civilized people living under the rules of the British Government. There is no exposed frontier, and the hills in general are very accessible. The quantity of land available and fit for allotment to settlers is estimated to amount to 4,50,000 acres. The population may be said to amount to between 120 and 150,000 souls: the people are industrious, honest, and truthful, compared with those in the plains, and if well treated, settlers would not find it difficult to obtain the services of the Khasseahs both



men and women for agricultural and house purposes ; but the rate of wages demanded would not be less than 5 rupees a month by the men, and 4 rupees by a woman servant.

45. Cattle are also procurable, bullocks being valued at about rupees 12, and cows at rupees 15 per head ; but at present the only available carriage is that of porters. This however is expensive and diverts a large amount of labor which ought to be available for agricultural and other purposes. All colonists settling in those hills should at once make use of pack-cattle, ponies, mules, donkeys, or bullocks, which would answer the purposes very well, and it would therefore be advisable that all intending settlers should make themselves acquainted with the construction of pack-saddles and the gear necessary to use them ; and as animals used in this way should be shod, it would be as well that the colonist should know how to shoe them. The shoes could be made up in the Khasseah villages.

46. The Government Trunk Road which runs across the hills from Gowhatti to the foot of the range bordering on the Sylhet district, is a fine piece of work. There are a good many excellent stone bridges, but as the suspension bridge which existed over the Bogapanee was carried away in 1851, and has not been re-built, several small bridges are wanting specially in the hills bordering on Assam and in the plains between the foot of the hills and Gowhatti.

47. The cross roads or trunks which traverse the country are very probable, owing to the open nature of the country, except in the vicinity of the plains of Assam. The people of the country keep them open, and very little requires being done to them, and that only in some places to make them all that can for the present be required.

48. No meteorological statistics exist of any place in the hills except Cherra Poonjee. At this station the thermometer ranges from 40 to 82, or 15 degrees lower than in Calcutta, but in the interior it must be at best 5 degrees cooler than at Cherra Poonjee. At this station also the quantity of rain that falls amounts to the enormous annual average of 600 inches, whilst in the central division it probably does not exceed 100 or at the most 150 inches ; the difference is remarkable, but is well known to all the Natives of the country and all Europeans who have long resided in these hills.

49. As a means of further aiding the colonist and of improving the agriculture of these hills, I would beg to suggest that a Government experimental farm be established in some place within the limits of the central division, to be superintended by a regular practical English farmer. The colonist and Native of the hills would then have an opportunity of seeing for himself what crops flourished the best, and in what way the rotation and manuring of crops should be managed. It might also be possible to distribute seed from the farm, and in many ways to assist the colonist that need not here be detailed.

50. In conclusion I would add, that as nothing of the kind is obtainable in these hills fit for the use and necessary for the comfort of a European colonist, it would be as well that before leaving the plains, he should provide himself and family with warm clothing, a supply of strong shoes, a few simple implements of husbandry, and carpenter's tools, also some chairs, tables, bedsteads, &c., and cooking apparatus. At first of course the colonist would have to rough it, and the first settlers would necessarily have to contend with the greatest difficulties, but these would all disappear in the course of time; and as the house became comfortable and the farm began to thrive, when neighbours had settled round about, and the result of honest labor had been realized, few I think would ever regret having removed from the burning heat of the plains, or fail to appreciate the benefits they derived from the delightfully cool and healthy climate of these hills.

From Captain E. A. ROWLATT, Principal Assistant Commissioner, to the Commissioner of Assam,—(dated the 22nd February 1861.)

I beg to inform you that I have just visited Shillong in company with Major W. Richardson, the president of the Shillong committee, for the purpose of ascertaining the quantity of water available at this season of the year for use, should it eventually be determined to establish a station there for the location of European troops, &c. I also beg to add, the quantity discharged by the two streams at Cherra Poonjee for the sake of comparison. The quantity of water was ascertained by actual measurement made by catching the water when collected into a single stream, so as to fall into a large tin vessel holding forty-nine gallons and a half.

11th February 1861.

At Cherra Poonjee.

Eastern stream discharges  $33\frac{3}{4}$  gallons per minute, or 48,600 per diem of twenty-four hours.—Western ditto  $21\frac{1}{2}$  gallons per minute, or 30,584 per diem of twenty-four hours.

At Shillong, 21st February 1861, 300 gallons per minute, or 4,32,000 per diem of twenty-four hours.

From Lieutenant Colonel C. B. YOUNG, Secretary to the Government of Bengal, Public Works Department, to the Secretary to the Government of India, Military Department,—(No. 2455, dated Fort William, the 3rd June 1861.)

IN continuation of my letter No. 2271, of the 23rd ultimo, I am directed to forward, for the information of the Government of India, as bearing on the same subject, copy of a very interesting communication\* received from the Commissioner of Assam, and of its enclosure, (with a rough sketch in original,) recommending the transfer of the Civil station of Cherra Poonjee in the Cachar Hills to Shillong, the newly proposed Sanatorium in those hills, and reporting on a direct line of communication between it and Gowhatty on the Berhampooter River.

\*No. 44 of 8th May 1861.

2. The Commissioner recommends the construction of this road. He says that even now before any road has been opened out, or a sod turned, or a nullah bridged, a rock blasted, or a tree felled, Shillong has been found accessible from the banks of the Berhampooter in three marches, Captain Rowlatt having accomplished the distance by easy travelling in three stages, and that too at a time of the year when marching was supposed to be fatal.

3. Captain Hopkinson observes that the construction of the road proposed by him will reduce the distance from Gowhatty to Cherra Poonjee by twenty-seven miles, necessitating the making of seventy-eight new, instead of maintaining and repairing 105 miles of the old road which passes *via* Nunklow.

4. The Superintending Engineer of the Assam Circle, Lieutenant Colonel Reid, will this day be desired to report upon the relative merits of the two roads ; and until the receipt of his report nothing definite can be done. The road now proposed will apparently require more expensive bridging, but seems in other respects to possess advantages over the existing one.

5. The Superintending Engineer will be authorized to incur such expense as may be necessary, not exceeding 2,000 Rupees, to enable him to have the road cleared, surveyed, and reported on.

From HENRY HOPKINSON, Esq., Agent Governor General, North-Eastern Frontier, to the Secretary to the Government of Bengal, Public Works Department,—(No. 44, dated the 8th May 1861.)

In continuation and with reference to the subject of my predecessor's letter No. 127, dated the 22nd September 1860, I have the honor to submit, for the communication of His Honor the Lieutenant Governor, an important report by Captain E. A. Rowlatt, Officiating Deputy Commissioner of Assam, by which the perfect practicability of a road from Shillong to Gowhatty may be said to be settled.

2. It will be remembered that my predecessor while expatiating on the benefit of a road between Shillong and Gowhatty was sceptical as to its practicability, or pronounced it only practicable in the way the waggon road through the Tyrolesc Mountains had been found practicable, that is, at a heavy cost. It was further observed by Colonel Jenkins that, even if the road were made, it would not alter the deadly nature of the country through which it must run, and Europeans could only travel by it during the months of November, December, January, and February.

3. Captain Rowlatt's report records the pregnant fact that he left Shillong on the 8th and arrived at Gowhatty on the 11th March 1861.

So much for the impracticability of the line therefore. It is tried, and on the first trial the explorer traverses the whole distance easily in three marches ; a month later than the latest month Colonel Jenkins allows for Europeans to travel along the made road.

4. Again the line presents but few engineering difficulties; the most serious is a descent of 2000 feet in four miles between Oomkraow and Oomean, and unlike the route *via* Nunklow which presents a perpetual succession of ascents and descents for nearly the whole way: an elevation in the Gowhatty and Shillong line once attained is never subsequently lost. There is a small range of hills between Gowhatty and Burnechat to which Captain Rowlatt refers as offering obstruction; but since he wrote it has been discovered that the range can be easily turned.

5. From Shillong to Oomean the distance is	.	8 miles.
From Oomean to Nengpo	..	14 „
„ Nengpo to Burnechat	..	15 „
„ Burnechat to Gowhatty	..	13 „
		<hr/>
		50 miles.
		<hr/>

A total of fifty miles, or to Cherra Poonjee seventy-eight miles. The distance from Gowhatty to Nunklow by the present road being sixty miles or 105 to Cherra Poonjee, we have thus at the distance of fifty miles from Gowhatty a magnificent table land many miles in extent, upwards of 6,000 feet above the level of the sea, well watered, yet possessing a comparatively dry climate, and which before a road has been opened out, or a sod turned, or a nullah bridged, or a rock blasted, or a tree felled, has been found accessible from the banks of the Berhampooter in three marches.

6. As to the asserted malarious nature of the country through which the road must pass, it can only be for the first twenty-eight miles at the outside, and no portion of this interval is probably worse than Gowhatty itself. In fact, unlike the Gowhatty and Nunklow road, the tract is tolerably well peopled, which raises a double presumption in favor of the climate; first, because if it had been very bad, it would have prevented settlers coming; and next, because their presence must have improved it. Captain Rowlatt indeed observes that “although the country would naturally be one vast tree forest, it is at the present time comparatively open from the extent of the clearances and cultivation which are constantly going on.” I may add that the perils of the Terai used to be equally insisted

upon in the case of Darjeeling, Mussooree and the Neelgherries, but few people think about them or even suffer from them now-a-days.

7. If European Troops are to be cantoned in the Cossiah Hills, it must be at Shillong, and this would necessitate a road between Shillong and Gowhatty.

8. Though Europeans should not be cantoned at Shillong, Shillong still remains a far more suitable locality than Cherra Poonjee for the Head Quarters of the civil administration of the Cossiah Hills. It is more central. It is surrounded by populous villages, whereas Cherra Poonjee is in the midst of a desert, and its climate does not, as that of Cherra Poonjee does, interrupt communications at any season of the year. The situation of Cherra Poonjee has never since its establishment been approved of, while a host of authorities, geologists, botanists, political officers, &c., have concurred in recommending a removal either to Shillong or to situations in its vicinity. There are no public buildings to abandon at Cherra Poonjee; but a Jail and a Cutcherry are now required, which is a reason for deciding upon a removal at once, in order that they may be commenced at Shillong.

But the civil station could not be transferred from Cherra Poonjee to Shillong, unless it were understood that a road was to be constructed between Shillong and Gowhatty.

9. Lastly, even if the formation of a new station at Shillong be objected to, the road between Shillong and Gowhatty should still be constructed, since it would reduce the distance from Gowhatty to Cherra Poonjee from 105 miles to only 78; and against the cost of constructing this seventy-eight miles of road there will have to be set the saving of the cost of the repairs lately ordered by the Government for the old road, which might then be abandoned, for two roads are not wanted; and as the old road has been allowed to fall into very great disrepair, as the most expensive bridges on it have to be restored and the dâk bungalows re-built, I shall not be surprised to find that the estimated cost of its repairs would almost cover the expense of constructing the new road.

10. I now therefore most respectfully press upon the attention of Government the expediency of at once having this Shillong road

surveyed and estimated for, a preliminary credit for the cost of survey, and to cut a track the whole way, or at least to Shillong from Gowhatty, being taken in the forthcoming budget. In this case the repairs upon the old road might be deferred for another year, otherwise they must go on.

11. It seems to me that the Government has not been led hitherto to appreciate the position of the Cossiah Hills in respect to Assam. Approached as they are generally from Sylhet, and people penetrating rarely further into them than Cherra Poonjee, Assam has been regarded as separated from and lying remotely beyond them; but the truth is, the Cossiah Hills are an integral portion of Assam. At Gowhatty the Berhampooter washes the foot of the Cossiah Hills. Gowhatty itself is situated partly upon a spur of the Cossiah Hills. Five miles from Gowhatty I am within the independent territory of the Cossiah Hills, and Cherra Poonjee is the most accessible station from my Head Quarters. With a proper road Gowhatty might be a large port for all the trade of the Cossiah Hills.

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From Captain E. A. ROWLATT, Officiating Deputy Commissioner of Assam, to Captain H. HOPKINSON, Commissioner of Assam,—(No. 121, dated the 3rd April 1861.)

Having taken the opportunity of being ordered down from Cherra Poonjee to this station to march from Shillong straight down to Gowhatty instead of going by the high road, I now beg to submit for your information, a report on the route between these two places, which I would have done at an earlier date had I not been prevented doing so by illness.

2. I left Shillong at 7 A. M. on the morning of the 9th March—there was then hoarfrost on the ground, the thermometer in my hut standing at 46°—there was scarcely any wind, but the air was clear, bracing, and highly invigorating. The spring flowers were just beginning to appear, and the new grass which covered the slopes added much to the beauty of the general scenery. I must say I left with much regret. I reached Gowhatty easily on the third day.

3. On leaving the table land, the path leads down a spur of about two miles in length, the slope of which is so easy that a person

on a pony can easily gallop either up or down, as I have often done myself. At the bottom of this spur there is a small stream called the Oomsirpee of about fifty feet width. This is crossed at a ford where the water is seldom above knee deep. A bridge would here be required, but it need not be more than thirty feet span, as the stream above and below the ford is not more than about that width. The descent down to this stream may be set down at 500 feet.

4. After crossing the Oomsirpee you enter on the plain of Yeodo, which is at least six miles long by three wide, and studded all over with villages, some of which are of considerable size. The present path which the road would follow with some slight exceptions, passes through the Yeodo Bazar, and then through the village of Mowsera, and after continuing for some distance over gently undulating ground, brings you to the Oomkraow, a stream of some size, over which a bridge would be required of two arches of not less than fifteen feet each.

5. The distance between the Oomsirpee and Oomkraow is about two miles, and the road between these two points could be reduced to a dead level without incurring much expense ; and except a few drains in the hollows to prevent accumulations of rain water at the side of the road, no other bridges would be required between Shillong and this stream.

6. Leaving the Oomkraow, the path still continues for some distance along almost level ground, and then commences a gradual descent down the mountain towards the Oomean, the river at its base. This descent is about four miles long, and although the present native path is steep in one place, this can very easily be avoided by taking the road along the side instead of over the crest of the hill it at present passes over. The descent from the Oomkraow to the Oomean is about 2000 feet ; and as it will with a very little engineering skill be quite possible to diffuse the height to be attained equally over the whole four miles, the gradient of this part of the road, which will be the steepest throughout the whole line, will not exceed one in ten.

7. On reaching the bottom of this range, the descent thus effected is made once for all, as there are no high ridges to cross in the direction of Gowhatty.



8. The Oomean River flows through a village several miles wide ; it varies in breadth from eighty to 100 yards : the stream is gentle and it is not subject to violent rushes of water even during the rains, and no drift of any kind ever comes down it, there would therefore be no difficulty in throwing a bridge across it, as materials, both wood and stone, are procurable close at hand.

9. The valley of the Oomean is about three miles broad and contains several villages near where the road would cross it. To the north of it there is a small range of hills, but in this range there is a gap through which the road should run, and which it would do without rising or falling until it got well clear of this range, when it would enter upon an open undulating country free from all ridges or chains of hills, which extends northwards for a long distance gradually sloping down towards the north. After passing by or through the villages of Nongkhorai and Nongjoonee, the road would reach Nongfo, a village on the borders of this undulating country, which may be put down as fourteen miles distant from the Oomean River, or twenty-two from Shillong.

10. Between the Oomean River and the village of Nongfo the road would cross several small streams, namely the Oomtriang, Oomsmer, Oomrang, and Oosmsan ; but the country thus far is completely open, although there are here and there patches of wood from which much useful timber could be procured.

11. From Nongfo the country northward changes its character altogether ; it becomes very much more abrupt and broken and covered in places with tree forests. Large hills are here scattered about, interspersed with valleys in which rice cultivation is carried on to a considerable extent ; but these hills have been very much cleared by the Cossiahs and Meckirs of these parts for cotton and the dry grain crops, so that, although the country would naturally be one vast tree forest, it is at the present time comparatively clear and open from the extent of the clearances and cultivation which are constantly going on.

12. After leaving Nongfo, the road should be carried along the side of a rivulet to the village of Nongkhra, and passing which, continue skirting the Oomfing, leaving the Sangkhongbaro Hill to

the west, at the foot of which it should cross the Oomling River, a stream not more than twenty feet wide; it would then have to be carried parallel to a small watercourse falling into the Oomling, then pass east of the Rungsakhee Hill and between the Nongkulla Hill and village of Oomdap, and so on down to Bornee Hauth on the banks of the Dibroo or Degroo River.

13. The distance from Nongfo to Bornee Hauth must be about fifteen miles; and although the country, as before observed, is rather rugged, the road if carried in the direction sketched out, would cross no ridges, but with trifling exceptions continue gradually sloping down all the way to the river.

14. The Degroo River rises near the Sathpoonjies, which are a day's journey to the west of the line this road would take, there is therefore no way of escaping it by taking a route further westward. It flows through a valley three or four miles wide, and at Bornee Hauth, is not less than 120 yards wide. The stream is gentle and it is navigable for boats all the year round. At the present time it has two feet six inches of water in it at the deepest place, and until a bridge could be built, a ferry would answer all the purposes of keeping open the communication across it.

15. On leaving the Degroo the road must be taken over the range of hills separating that valley from the plain of Beltollah. This range does not any where exceed 1,000 feet in height, and is not more than six miles across; but before determining on what route the road should take, it would be advisable to have these hills thoroughly explored. There are at present many very fair roads over them, and that from Borbhoi in the Degroo valley facing Bornee Hauth *via* Patgaon down to Pelangkatta, is perhaps the most direct; but I have no doubt that a better route than that could be found, as the present roads have been made to connect village with village, and not for the purpose of crossing the range by the easiest route.

16. After reaching the northern foot of this range, it is all level ground into Gowhatty. The distance from Bornee Hauth I should put down at thirteen miles, the last seven miles of which into Gowhatty, would be in the plains.

17. It is an unfortunate circumstance that there should be this range of low hills separating the valley of the Degroo from Beltollah ; for, as they are very nearly on the same level, all the height that is gained must be lost in the descent down again, a contingency that ought to be avoided in all hill roads, but which, in the present instance, there is no way of escaping.

18. Although it might perhaps have been preferable had the Degroo River not intervened in the line the road must take, it still must not be disregarded, as by this river it will be possible to send up baggage as far as Bornee Hauth by boat, and that from that point the portorage of goods to be sent up to Shillong will thereby be reduced to two days.

19. The Degroo, as will be perceived in the map, falls into the Kullung River about two miles from its junction with the Berhampooter, a boat therefore starting from Gowhatty would proceed up the Berhampooter to the Kullong mouth,—thirteen miles—enter the Kullong and then the Degroo, passing by Sonapore and reaching Bornee Hauth, to which the distance by this route would not exceed forty miles.

20. For stores and other heavy baggage, therefore, the point of departure by land would be Bornee Hauth ; and as the road from thence would be a gradual ascent the whole way, there is no reason why goods of all kinds should not be conveyed from Gowhatty to Shillong at a very trifling cost.

21. At present the Bornee Hauth is not very largely attended, being principally a cotton mart, but as soon as the road was opened out, this place would become one of importance, as all the trade now carried on at Sonapore, about twelve miles lower down on the Degroo, would be transferred to this Hauth, and supplies of all sorts, cattle, poultry, fish, grain, &c., reach Shillong from this market.

22. Another advantage to be gained by opening out a road in the direction proposed, would be that a large extent of land would thereby become available for tea and coffee plantations and other agricultural operations, which at present are lying useless from the difficulty of getting at them.

23. It may not be expected that in a preliminary report of this kind I should advert to the expense it would be necessary to incur

in making a road direct from Gowhatty to Shillong, much must of course depend on the kind of road to be constructed. I may however observe that a road as good as the present one to Nungklow, which is about the same distance, could certainly, without the bridges over the Oomean and Degroo, be made for 25,000 rupees ; and as the line of country to be passed over is so infinitely easy compared to that over which the present road passes, it would, I am sure, be far cheaper to construct a good road across the hills in the direction now proposed than to complete the one now in existence, which, independently, being most unnecessarily circuitous in its course, has unfortunately also been carried over the most difficult line of country it was possible to select.

24. Before concluding I would wish to place it on record that the Natives who could give the most assistance in marking out and superintending the construction for a road from Gowhatty to Shillong are Solomon Dobasheeah at Cherra Poonjee, who accompanied me down as far as Bornee Hauth ; Runnoo Sing of Mowphrain ; and Marenga and Jurrun Sing of Amthoree, both of whom are well acquainted with this part of the country.

25. I herewith beg to annex a rough sketch map of the country between this and Shillong, which will, I trust, assist in rendering the report intelligible.

26. In conclusion I would beg leave to suggest that a copy of this report be sent to Colonel D. Reid, the Superintending Engineer of the Assam Circle, for his information.

From Colonel A. BECHER, C. B., Quarter Master General of the Army, to the Secretary to the Government of India, Military Department,—(No. 819C, dated Head Quarters, Calcutta, the 17th June 1861.)

IN forwarding the accompanying documents, in original, regarding the site of Shillong as a Sanatorium for European troops, I have the honor to request you will submit the same, most strongly recommended by His Excellency the Commander-in-Chief, for the favorable consideration of Government, drawing particular attention to the report of Dr. Thorp.

2. On receipt of the first report, information was called for regarding the supply of water; the answer was satisfactory;—*vide* enclosed letter No. 20, dated 10th March last, from Major Richardson.

3. His Excellency is of opinion that a European regiment might advantageously be located in that part of the country, as there could not in any point of view be a better site for a station than Shillong.

*Proceedings of a Committee assembled by order of His Excellency the Commander-in-Chief, for the purpose of inspecting the ground at Shillong and of reporting as to the fitness of the place for the erection of barracks for European Troops, and more especially with reference to;—1st, the healthiness of the site; 2nd, dimensions of building space; 3rd, supply of water and provisions; 4th, approaches; 5th, state of vegetation during the rains, and quantity of rain which falls during the year.*

PRESIDENT:

Major W. RICHARDSON, Commanding at Cherra Poonjee.

MEMBERS:

Captain ROWLATT, Principal Asst. Commissioner, Cossiah Hills.

Dr. THORP, Surgeon in Medical charge, E. I. Regiment.

Mr. G. MUNRO, Executive Engineer, Sylhet.

*Second medical member, appointed by Quarter Master General's office memo. No. 4257, Head Quarters, Calcutta, 31st July 1860, Dr. J. McCLELLAND, Officiating Inspector General of Hospitals.*

The committee proceeded early in August and early in September for the purpose of carrying out their instructions, and have now to record their opinions on the several points alluded to in the Quarter Master General's letter No. 4079, dated Head Quarters, Calcutta, 12th July 1860.

The ground selected by the committee for a future station is

1st.—The healthiness of an undulating table land, at an elevation of 5,600 feet above the sea, running from south-east to north-west.

The villages of Sadoo and Pombrew in the immediate vicinity of the site are very healthy, and the Khasseahs themselves consider this neighbourhood as the most healthy in these hills.

The inhabitants of these villages are strong and healthy, looking free from spleen, and the children stout limbed and rosy. They say that fever is not known amongst them, except when some of the men who attend the markets at Soonepore and Beltollah on the Assam side, get an attack in passing through the forest; or who work in the fields situated lower down in valleys towards the plains, get occasional fever of a mild continued type. There is no swampy ground near the site selected. The ground at the north-east end of the site slopes toward the south by a very gentle descent, and the bottoms are dry and hard even at this season. Towards the north it descends much more abruptly, and is cut up by steep ravines having water in them: these would answer well for carrying off the drainage from the privies and slaughter houses, as there is a fall of from 2 to 300 feet. At the south-west end of the site near the stream the ground is more even, and the drainage would require to be carried to some distance into the lower ravines. The barracks should be built on the slopes to be protected in some degree from the south-west winds. The soil is a yellow loamy clay, thinly covering the heights which are composed of a hard sandstone. In the bottoms the soil is more abundant, rich, and fertile, well adapted for gardens. The country around is sufficiently level to afford room for plenty of exercise without any great exertion.

The committee are of opinion that the plateau which would form the station of Shilling, is of ample size to accommodate 2 regiments or more, and that the best piece of ground for that purpose consists of a range of low undulating hills, commencing at a stream 8 miles from the village of Moflung, which is on the road from Cherra to Assam,—and one from the village of Sadoo. These hills run from south-west to north-east for nearly 2 miles parallel to the high ridge of the Shillong hill, which partially shelters the station, lying perhaps 500 feet lower in elevation than the Shillong hill itself.

This ground has been measured by Mr. Munro, and found to consist of  $1\frac{3}{4}$  miles in length by an average breadth of  $\frac{1}{2}$  a mile;

but this by no means constitutes the whole of the ground, as on both sides of this measured piece are similar ridges and hills, all well adapted for building, and nowhere rising more than perhaps 100 feet above the general level, with sides of such a gradual slope that a horse can almost everywhere canter up or down them. After reaching the end of this measured ground, moreover, the plateau turns

toward the Shillong hill in the form of a  
horse-shoe, presenting an admirable site for  
a station at the north-east end of the ground, provided that the water at this end lasts all the year round, which the Committee believe to be the case.

The entrance to the ground above described, lies across the stream which furnishes water to the station, and which for a quarter of a mile before it falls over and leaves the plateau, runs directly across it from south-east to north-west; and if it is determined to canton a small force of Europeans at Shillong, the committee would recommend that the men be located at this spot as a commencement, as there

is before reaching the stream an extensive  
slope curving towards the stream and quite  
sheltered from the south-west monsoon. At this spot too is the largest quantity of water; and on the north-east side of the stream commences the measured piece of ground before mentioned. Moreover, at this end of the ground are large quantities of sandstone adapted for building, and it is nearer our supplies of coal and lime, which must be brought from a village 7 miles north of Cherra, on the road to Shillong.

Water is supplied from a stream which rises at the north-east end of the station from a spring: it runs  
*3rd.*—Supply of water and provisions.

through the valley formed by the Shillong Hill,  
and the station plateau at some little distance  
from the latter, perhaps  $\frac{1}{2}$  a mile. It is small at first running over a gravelly bottom 4 feet below the level of the ground, and is near its commencement 15 inches deep, and 3 or 4 feet wide in September. When visited by Captain Rowlatt, in April 1860, it contained about half as much water, and the natives report that it runs all the year through; but as February is the driest month in these hills, it should be examined in that month. As the stream proceeds towards the south-west end of

the plateau, it is fed by small streams from the Shillong Hills, and also by several springs, till at the south-west end it turns suddenly and runs directly across the plateau for  $\frac{1}{4}$  mile, and falls a good sized stream over a cliff 30 feet high, and then rapidly descends to the valley. It is, after it has made this turn to the north-west, that it runs through the ground recommended to be occupied in the first place. Between the stream and the measured station ground are numerous springs, where the committee believe that wells might be sunk with little labor and good results.

The Natives are unanimous in asserting that this stream contains a large supply of water through the whole year, but no member of the Committee has seen it in February or March; and it should undoubtedly be visited, and a separate report made on it before the first rain falls.

Supply of provisions.                      Horned cattle are plenty—of a size large.  
as compared with those of the plains—their  
price is from 12 to 16 rupees.

Jynteah is also well supplied with cattle, and herds are brought up yearly from Assam. At Cherra beef is good, plentiful, and moderate in price. One of the men who kills, gives his opinion that he could always supply 3 animals a day by sending out men to the villages about Cherra, while Cherra itself is supplied from the direction of Assam, Shillong, and Jynteah; so that the committee think a wing of a regiment might be fed. Sheep are not to be had, but would doubtless thrive on the pastures about Shillong.

Goats and pigs are procurable, and beef and pork are sold ready killed in the market of Yeodo, 3 miles from Shillong, where rice is sold at about 15 seers the rupee, though not well cleaned.

The committee saw no rice cultivation about Shillong, but different sorts of millet are grown, and the natives say that the same ground will produce 2 crops a year. Doubtless wheat and barley might be grown with success, as well as all sorts of European vegetables. Apples and damsons grow wild, and potatoes are abundant.



Steamers go up the Berhampooter at all seasons of the year, and must pass within 40 or 50 miles of Shillong.

4th.—Approaches.

As far as the committee can ascertain, a path leads with a gradual downward slope to Beltollah Bazar in the plains, 7 miles from Gowhatty south. The natives say a cooly can go to Beltollah in 3 days.

The Native overseer with the committee went in this direction 21 measured miles in search of wood; he describes the path as a gentle slope, all the way similar to that from the station to Yeodo, which is very easy. A carriage road might probably be made to Gowhatty in this direction, and the steep descent on the Assam road at Nungklow 2,205 feet, be avoided.

The committee look upon the Assam side as the only one by which Shillong can be reached at all seasons of the year, provided the forest is healthy, which remains uncertain. On the other side steamers can only reach Sylhet in the rains. In December 1857, Her Majesty's 54th regiment attempted to come up by steam but were stopped 40 miles down the river. The passage up by country boats is tedious in the extreme—12 or 14 days from Dacca.

From Sylhet during the dry months, people cross the country through rice *khets* to Terria at the foot of the hills (25 miles). In the rains small boats go from Sylhet to Pundua (3 miles short of Terria) in 5 or 6 hours. From Pundua to Terria it is usual to take an elephant; but after heavy rains there is a river which stops up the road. After a few fine days a man can easily walk from Pundua to Terria. The river should be bridged.

During about 2 months of the year, when the ground is not dry and the water not deep, (before and after the rains) Pundua can only be reached from Sylhet by going down the river to Chatuk, and then pulling up the Pundua river—this takes 2 days.

From Terria to Cherra Poonjee is 7 miles of very steep ascent, and then 3 of a very easy slope—10 miles in all. The whole road is very good, but the first 7 miles is quite impracticable for wheeled carriages; the whole rise is 4118 above sea level, and very nearly as much above Terria where the ascent begins.

The present means of access to Shillong from Cherra are by the Assam road to Moflung—18 miles. The road is very good but too steep for wheeled carriages—the first two miles level round the village of Cherra, thence an easy slope upwards of one mile—the road is then level with slight exceptions to Kalapance at the 10th mile, reached by a mile of descent—this is crossed by a good stone bridge. Beyond this after a slight rise, a steep descent leads to Bogapance, which is crossed at the 15th mile by a native bridge for foot passengers. A bridge should be built here, as there is no ford by which horses can cross after rain. From this bridge a steep ascent, 1500 feet in 2 miles, leads us to the top of the hill, and one mile further is Moflung, with a Government staging bungalow.

From Moflung an undulating plain leads to Shillong, 8 miles. Only one water course is met with in this distance, and that could easily be bridged, as there is a descent of only about 100 feet to the water, and a similar rise beyond.

The committee believe there is another and more level route leaving the Assam road at about the 9th mile, missing the Kalapance and reaching the Bogapance near Molecm, where the river is much nearer the top of the table land. A spot might, the committee think, be found where the descent to the water would be only about 500 feet, and this would be the straighter line to Shillong from Cherra; but till this road can be made, the committee recommend that the Bogapance be bridged below Moflung, and that a temporary road be marked out from Moflung to Shillong. This latter could be done at slight expense, as there is, as before said, but one considerable water course to be bridged. This would render the whole distance from Terria, at the foot of the hills, to Shillong, practicable for troops and carriage cattle at all seasons of the year. At present coolies are the only carriage procurable.

The proposed site of the station of Shillong, as well as the surrounding hills, is covered at this season of the year (September) with choppering grass, as high generally as the knee, though sometimes

5th.—State of vegetation during the rains, and quantity of rain in the year.

a little higher. In some of the ravines tree jungle with a thick undergrowth of small bamboos exist, but there is no need for building near these spots; and the trees doubtless protect the springs which rise there.

The country may be described as an undulating grass plain (grass nowhere rank) well cultivated in parts, extending from Moflung, to the north-east end of the station—ten miles in one direction, and of a varying breadth, which at the station itself may be called  $1\frac{1}{2}$  miles.

The quantity of rain which fell at Shillong and Cherra Poonjee during the month of August 1860, is at the former 40·90 inches, and at the latter 149·27 inches; and those who have been at both places invariably state that the fall at Cherra is three times that of the interior of the hills. It may also be mentioned that in the Khassea hills the rain is heavier at night, and that but little falls during the cold season.

The meteorological register of each station is attached.

	Though Shillong is itself but scantily inhabited, and there is only
General remarks.	one small hamlet of about a dozen huts on
	the proposed site of the station, yet there are
numerous villages all round within 3 and 6 miles:—the large iron	
Smelting village of Moleem south-west 4	
Surrounding country.	miles,—Sadoo and Nungpien villages, 1 or 2
miles west,—the plain and bazar of Yeodo, 3 miles north. The bazar	
is only held in a grove of trees, but is surrounded on all sides by vil-	
lages, and the country about is fairly cultivated, while herds of cattle	
pasture on the hills.	

Nungkrim, a large village south-east, about 5 miles, with very extensive iron furnaces.

	From the evidence of the natives, their mode of constructing their
Prevailing winds.	huts, and the inclination of the trees about
	Shillong, the south-west is evidently the most
prevalent wind, and the most severe. Barracks should in the opinion of	
the committee, be built in positions having a north-east aspect, and of	
such positions there is no scarcity.	

Stone for building exists in great quantities at the south-west end of the ground and elsewhere. Lime and coal have not been found nearer than at a village 7 miles from Cherra on the Assam and Shillong road—about 20 miles from Shillong.

Wood in small quantities is found in the valley below the station, sufficient doubtless to build huts for the wing of a regiment. Fir trees grow all over the hills, but none large enough to be of much use; as when 4 or 5 years old they are cut for charcoal.

The overseer of public works went 20 miles on the road to Assam, and there came to good building timber in scattered patches. The overseer cannot say how much timber is procurable, as he reported that the Natives with him would go no further dreading sickness, but the quantity appears to increase greatly as we approach Assam.

Slates for roofing are procurable of a good quality on the Assam road,  $1\frac{1}{2}$  miles from Moflung north—thatching grass is plentiful about Shillong itself.

The Committee cease their proceedings this 13th day of September 1860.

#### ANNEXED

1.—Meteorological registers of Shillong and of Cherra Poonjee for August 1860.

2.—A sketch map of the ground at Shillong by Mr. C. K. Hudson. Mr. Hudson not having himself seen the ground, the distances are not properly defined.

*Meteorological Register kept at the Hospital of the Sylhet Light Infantry*

LATITUDE 15° 16'

LONGITUDE 19° 43'

Days of the month.	AT SUNRISE.				AT 10 A. M.				AT 4 P. M.						
	Barometer.	Temperature.			Barometer.	Temperature.			Barometer.	Temperature.					
		Of Mercury.	Of the air.	Of wet bulb.		Direction of the wind.	Of Mercury.	Of the air.		Of wet bulb.	Direction of the wind.	Of Mercury.	Of the air.	Of wet bulb.	Direction of the wind.
Ins.				Ins.				Ins.							
1		67		W.		71		S.		69		S.			
2		69		S.		73		S.		73		S.			
3		70		W.		72		N.		74		N.			
4		69		N.		69		N.		72		N.			
5		68		N.		75		E.		73		E.			
6		70		W.		76		W.		72		W.			
7		71		S.		74		W.		78		W.			
8		68		N.		75		W.		73		W.			
9		70		N.		76		W.		71		W.			
10		63		E.		74		N.		73		W.			
11		70		S.		75		W.		64		S.			
12		74		W.		73		W.		76		W.			
13		63		N. E.		70		E.		72		E.			
14		68		W.		71		W.		72		W.			
15		67		S.		69		W.		70		W.			
16		68		S.		71		S.		73		S.			
17		67		W.		68		W.		68		W.			
18		62		N.		69		N. E.		70		S.			
19		61		W.		68		W.		69		W.			
20		67		W.		72		W.		71		W.			
21		68		N. E.		73		N. E.		70		E.			
22		63		W.		68		S.		67		W.			
23		67		W.		72		N.		68		N.			
24		69		S.		71		W.		67		W.			
25		64		N. W.		68		W.		69		W.			
26		66		S. E.		69		W.		67		W.			
27		67		W.		73		W.		66		W.			
28		68		W.		72		S. W.		61		N.			
29		61		E.		74		S. E.		75		S.			
30		62		N.		73		N.		72		W.			
31		68		W.		71		W.		72		W.			

at the Station of Cherra Poonjee, for the month of August 1860.

HEIGHT ABOVE THE SEA 4,200.

1st September 1860.

At 10 P. M.				Thermometer in sun's rays at 4 P. M.	Self Registering Thermometer.		Rain Gauge.	Days of the month.
Barometer.	Temperature.				Maximum.	Minimum.		
	Of Mercury.	Of the air.	Of wet bulb.	Direction of the wind.				
Ins.							Ins.	
	61		N.	Cloudy.			1.50	
	69		N.	81			0	
	63		S.	95			1.10	
	60		N. E.	85			1.10	
	55		W.	Cloudy.			0	
	60		S.	81			2.55	
	63		E.	Cloudy.			0	
	59		S. E.	86			4.12	
	69		N.	90			3.71	
	61		S.	Cloudy.			1.92	
	61		W	Do.			2.10	
	68		N. E.	90			1.22	
	59		W.	Cloudy.			6.25	
	63		W.	85			5.35	
	61		S.	Cloudy.			4.30	
	65		W.	87			7.75	
	59		N.	Cloudy.			8.25	
	55		W.	Do.			5.50	
	50		S.	Do.			11.25	
	65		N. E.	Do.			12.75	
	55		W.	Do.			4.60	
	61		W.	Do.			7.50	
	56		S.	Do.			8.10	
	50		N. W.	Do.			9.25	
	64		S.	Do.			10.95	
	57		W.	Do.			11.20	
	56		W.	Do.			8.72	
	59		E.	75			6.21	
	58		N.	82			0	
	57		W.	Cloudy.			0	
	51		W.	Do.			4.12	
							149.27	

(Signed) T. DILLON,  
Assistant Surgeon.

LATITUDE 25° 32'

LONGITUDE 91° 52'

Days of the month.	AT SUNRISE.				AT 10 A. M.				AT 4 P. M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
	Barometer.	Temperature.			Barometer.	Temperature.			Barometer.	Temperature.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
		Of Mercury.	Of the air.	Of wet bulb.		Direction of the wind.	Of Mercury.	Of the air.		Of wet bulb.	Direction of the wind.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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of Shillong for the month of August 1860.

1st September 1860.

HEIGHT ABOVE THE SEA 5,600.

At 10 P. M.					Thermometer in sun's rays at 4 P. M.	Self-registering Thermometer.		Rain Gauge.	
Barometer.	Temperature.			Direction of the wind.		Maximum.	Minimum.		
	Of Mercury.	Of the air.	Of wet bulb.						
Ins.								Inches.	Cent.
	68			S.	74				
	68			E.	84				
	66			S.	86				80
	66			S.	88				
	68			S.	74				
	66			S.	74				
	66			S.	88				
	64			S.	78				
	62			S. S. E.	Cloudy.				30
	64			S. W.	Do.				50
	65			S. W.	Do.			4	
	68			S.	Do.			0	
	66			S.	Do.			2	50
	66			S. E.	Do.			0	90
	66			S. E.	Do.			0	60
	66			S. E.	Do.			3	
	64			S. E.	Do.			1	60
	64			S.	74			1	10
	66			S.	Cloudy.			1	80
	66			S.	Do.			0	20
	66			S.	Do.			1	90
	65			S.	Do.			2	80
	64			S.	Do.			5	20
	65			S.	Do.			4	10
	64			S.	Do.			6	60
	64			S.	Do.			1	40
	62			W.	Do.				80
	64			W.	Do.				20
	66			S.	Do.				
	68			S.	Do.				60
	68			S.	Do.				
								40	90

(True copy)

(Signed) W. RICHARDSON, Major,  
President.



*Meteorological Register kept at the Hospital of the Sylhet Light Infantry at the Station of Cherra Poonjee, for the month of September 1860.*

1st October 1860.

LATITUDE 15° 16' LONGITUDE 91° 41' HEIGHT ABOVE THE SEA 4,200.

Days of the month.	At SUNRISE.		At 10 A. M.		At 4 P. M.		At 10 P. M.		Thermometer in sun's rays at 4 p. m.	Rain Gauge.
	Temperature.		Temperature.		Temperature.		Temperature.			
	Of Mercury.	Direction of the wind.	Of Mercury.	Direction of the wind.	Of Mercury.	Direction of the wind.	Of Mercury.	Direction of the wind.		
1	67	N. E.	72	N.	70	N.	59	W.	Cloudy.	Ins. 1 Cent. 21
2	61	W.	75	W.	72	W.	58	W.	Ditto.	3 5
3	63	W.	70	S.	71	S.	56	S.	Ditto.	2 75
4	60	E.	72	N.	71	N.	56	W.	Ditto.	5 50
5	61	W.	75	W.	74	W.	58	E.	79	1 15
6	63	W.	76	S.	75	S. W.	57	N.	77	0 0
7	65	N. E.	71	N.	75	W.	56	W.	95	4 50
8	66	W.	69	W.	71	E.	55	W.	90	5 5
9	67	W.	68	W.	70	E.	57	S.	Cloudy.	2 95
10	59	N.	69	E.	71	S.	56	N.	Ditto.	6 50
11	68	W.	70	W.	72	W.	56	S.	Ditto.	3 4
12	60	S.	70	W.	73	W.	55	W.	81	2 10
13	68	W.	72	W.	71	W.	50	W.	Cloudy.	1 12
14	68	W.	70	W.	67	W.	59	W.	Ditto.	8 95
15	62	W.	68	W.	69	W.	51	S.	Ditto.	5 50
16	60	W.	67	W.	70	W.	53	W.	Ditto.	9 10
17	66	W.	68	W.	69	W.	51	E.	Ditto.	5 5
18	64	E.	68	E.	70	E.	55	W.	94	3 4
19	66	W.	70	W.	72	W.	54	N.	64	4 55
20	60	S.	74	S.	70	S.	54	N.	Cloudy.	1 3
21	67	N.	73	E.	68	E.	58	S.	Ditto.	6 25
22	69	S.	71	S.	69	W.	52	W.	Ditto.	7 50
23	65	W.	75	W.	63	W.	54	E.	95	0 0
24	60	S. W.	78	W.	65	W.	52	N.	100	0 0
25	66	N.	71	N.	71	N.	51	N.	90	0 0
26	61	N. W.	70	W.	73	W.	59	W.	80	3 10
27	62	W.	75	W.	74	W.	58	S.	100	0 0
28	68	E.	74	E.	71	E.	55	W.	Cloudy.	0 0
29	61	W.	75	W.	73	W.	50	N.	83	1 2
30	59	N.	76	N.	74	N.	50	N.	93	0 0
										94 1

(Signed) T. DILLON,  
Assistant Surgeon.

*Meteorological Register kept at the Station of Shillong for the month of September 1860.*

1st October 1860.

LATITUDE 25° 32' LONGITUDE 91° 52' HEIGHT ABOVE THE SEA 5,600.

Days of the month.	AT SUNRISE.				AT 10 A. M.				AT 4 P. M.				AT 10 P. M.				Thermometer in sun's rays at 4 P. M.	Self Registering Thermometer.		Rain Gauge.
	Barometer.	Temperature.		Direction of the wind.	Barometer.	Temperature.		Direction of the wind.	Barometer.	Temperature.		Direction of the wind.	Barometer.	Temperature.		Direction of the wind.		Maximum.	Minimum.	
		Of Mercury.	Of the air.			Of Mercury.	Of the air.			Of Mercury.	Of the air.			Of Mercury.	Of the air.					
Ins.					Ins.				Ins.				Ins.						Ins.	Cent.
1	65			S.	72			N.	66			N.	64			W.	Cloudy.		1	
2	64			S.	68			N.	68			S.W.	61			S.W.	Ditto.		30	
3	64			S.W.	66			S.W.	66			S.W.	64			S.W.	Ditto.		1	
4	64			S.W.	69			S.W.	72			S.	64			S.	96		40	
5	62			S.W.	69			S.W.	70			S. E.	66			E.	Cloudy.			
6	62			S.W.	70			S.	72			N.	66			N.	Ditto.		50	
7	64			S.W.	69			S.	71			S.	64			S.	Ditto.			
8	64			S.	70			E.	72			E.	64			S.	Ditto.			
9	64			S.W.	66			S.	69			E.	65			S.	Ditto.		60	
10	64			S.	68			N.	66			S.	66			S.	Ditto.		2	
11	64			S.	68			N.	68			S.	64			S.	Ditto.		20	
12	64			S.	72			W.	68			S.	64			S.	Ditto.			
13	62			W.	72			S.	68			S.	64			S.	Ditto.			
14	62			W.	68			S.	65			S.	64			S.	Ditto.			
15	62			W.	67			S.W.	65			S.	65			S.	Ditto.		2	
16	64			W.	67			W.	64			S.	62			W.	Ditto.		1	
17	64			W.	66			W.	65			S.	64			S.	Ditto.		1	
18	64			S.	66			S.	69			S.	65			S.	Ditto.		80	
19	64			S.	66			S.W.	67			S.	65			S.	Ditto.		50	
20	64			S.	66			S.W.	66			S.	65			S.	Ditto.			
21	62			S.	66			S.W.	66			S.	65			S.	Ditto.		4	
22	64			S.	66			S.W.	68			S.	65			S.	Ditto.		10	
23	62			S.	71			S.	69			S.	69			S.	Ditto.		1	
24	62			S.	70			S.	70			S.	68			N.	Ditto.		50	
25	64			S.	68			S.W.	68			S.	66			N.	Ditto.		2	
26	64			S.	68			S.W.	68			S.	67			S.	Ditto.		80	
27	62			S.	71			S.W.	69			S.	66			S.	Ditto.		50	
28	64			S.	70			S.	69			S.	68			N.	Ditto.			
29	62			S.	72			S.	70			S.	70			S.	Ditto.			
30	64			S.	72			N.	70			S.	70			N.	Ditto.			
																			22	
																			40	

(Signed)

SHEIK HINGUN,  
Native Doctor.

*Meteorological Register kept at the Hospital of the Sylhet Light Infantry Battalion*

LATITUDE 15° 16'

LONGITUDE 91° 41'

Days of the month.	At Sunrise.				At 10 A. M.				At 4 P. M.						
	Barometer.	Temperature.		Direction of the wind.	Barometer.	Temperature.		Direction of the wind.	Barometer.	Temperature.		Direction of the wind.			
		Of Mercury.	Of the air.			Of wet bulb.	Of Mercury.			Of the air.	Of wet bulb.		Of Mercury.	Of the air.	Of wet bulb.
Ins.				Ins.				Ins.							
1		68		N. E.		70		E.		71		N. E.			
2		65		S.		72		N.		73		S.			
3		61		W.		73		W.		70		W.			
4		60		E.		70		S.		68		S.			
5		61		W.		65		W.		50		W.			
6		65		S.		68		S.		67		S. W.			
7		66		N. W.		75		W.		71		W.			
8		66		S. E.		70		N.		71		N.			
9		69		E.		74		E.		72		E.			
10		68		W.		74		S.		70		S.			
11		62		N. E.		75		S. E.		68		S.			
12		65		N. W.		74		W.		71		W.			
13		63		W.		75		W.		69		W.			
14		65		W.		74		W.		70		S.			
15		61		W.		73		W.		72		W.			
16		63		W.		70		S.		73		S.			
17		60		S. W.		71		W.		69		W.			
18		55		W.		75		W.		68		W.			
19		61		W.		70		W.		68		W.			
20		59		N. E.		72		E.		63		W.			
21		62		E. N.		74		W.		67		W.			
22		60		W.		71		S. W.		62		W.			
23		57		S. W.		72		S.		61		W.			
24		53		W.		73		E.		70		E.			
25		61		E.		72		W.		71		W.			
26		63		W.		73		S.		72		S.			
27		61		E.		72		W.		71		W.			
28		60		N. E.		70		W.		62		W.			
29		61		W.		73		N. E.		63		N. E.			
30		62		N.		70		S.		69		W.			
31		65		W.		69		S.		60		W.			

at the Station of Cherra Poonjee, for the month of October 1860.

• 1st November 1860.

HEIGHT ABOVE THE SEA 4,260.

At 10 P. M.				Thermometer in sun's rays at 4 P. M.	Self Registering Thermometer.	Rain Gauge	Days of the month.	
Barometer.	Temperature.							Direction of the wind.
	Of Mercury.	Of the air.	Of wet bulb.					
Ins.					Maximum.	Minimum.	Inches.	
	65			S.	Cloudy			
	50			W.	Do.		19.92	
	54			S.	Do.		7.55	
	52			W.	Do.		16.25	
	63			W.	Do.		9.55	
	56			N.	Do.		2.75	
	49			S. E.	81			
	48			E.	90			
	43			N.	Cloudy			
	50			W.	Do.			
	56			N. W.	Do.			
	55			W.	Do.			
	57			N.	79			
	54			E.	82			
	50			N.	Cloudy			
	57			E.	83			
	40			W.	79		1.3	
	50			N.	90			
	51			N.	80			
	51			W.	Cloudy			
	40			S.W.	Do.			
	49			W.	78			
	50			W.	90			
	40			W.	77			
	44			E.	79			
	40			E.	95			
	40			W.	92			
	42			N.	91			
	40			W.	Cloudy		1.10	
	47			S.	83			
	40			W.	71		58.15	

(Signed) T. DILLON, *Asst. Surgn.,*  
In medical charge, *Sylhet Lt. Infy.*

*Meteorological Register kept at the Station of Skillong*

LATITUDE 25° 32'

LONGITUDE 91° 52'

Days of the month.	AT SUNRISE.				AT 10 A. M.				AT 4 P. M.						
	Barometer.	Temperature.		Direction of the wind.	Barometer.	Temperature.		Direction of the wind.	Barometer.	Temperature.		Direction of the wind.			
		Of Mercury.	Of the air.			Of wet bulb.	Of Mercury.			Of the air.	Of wet bulb.		Of Mercury.	Of the air.	Of wet bulb.
Ins.				Ins.				Ins.							
1		65		S.		69		S.		67		S.			
2		63		S.		64		S. W.		62		S.			
3		62		S. W.		62		S. W.		62		S.			
4		62		S.		62		S. W.		62		W.			
5		62		S.		66		S.		64		W.			
6		62		S.		68		S.		68		W.			
7		60		S.		69		S.		68		S.			
8		62		E.		71		E.		69		S.			
9		62		W.		71		E.		69		S.			
10		60		W.		66		S.		66		S.			
11		60		S.		65		S.		65		S.			
12		58		S.		65		N.		68		N.			
13		60		S.		65		N.		69		N.			
14		59		S.		63		W.		69		W.			
15		58		W.		65		S.		66		S.			
16		56		W.		64		S.		66		S.			
17		59		W.		64		S.		64		S.			
18		56		W.		64		S.		67		S.			
19		52		W.		65		N.		64		S.			
20		54		W.		66		N.		64		S.			
21		59		S.		64		S.		64		S.			
22		59		S.		65		S.		65		S.			
23		56		W.		66		S.		66		S.			
24		55		W.		65		S.		66		S.			
25		59		W.		67		S.		67		S.			
26		59		W.		70		S.		70		S.			
27		58		W.		69		W.		69		S.			
28		61		N.		66		W.		66		W.			
29		58		W.		66		S.		66		S. W.			
30		58		W.		68		S.		66		S. W.			
31		58		W.		68		S.		66		S. W.			

for the month of October 1860.

1st November 1860.

HEIGHT ABOVE THE SEA 5,600.

At 10 P. M.				Thermomèter in sun's rays at 4 P. M.	Self Registering Thermometer.		Rain Gauge.
Barometer.	Temperature.		Direction of the wind.		Maximum.	Minimum.	
	Of Mercury.	Of the air.					
Ins.							Inches.
	66		S.	Cloudy.			
	62		S.	Cloudy.			1
	62		S.	Cloudy.			1.20
	62		S.	Cloudy.			5.30
	62		N.	Cloudy.			4
	66		N.	Cloudy.			
	66		N.	Cloudy.			
	65		N.	Cloudy.			
	65		S.	Cloudy.			
	65		S.	Cloudy.			
	62		S.	Cloudy.			
	62		W.	Cloudy.			0.10
	61		W.	76			
	59		W.	84			
	60		S.	Cloudy.			0.10
	61		S.	Cloudy.			
	60		S.	Cloudy.			
	59		S.	Cloudy.			
	59		W.	84			
	61		S.	Cloudy.			
	64		S.	Cloudy.			
	64		N.	Cloudy.			
	66		S.	Cloudy.			
	66		S.	Cloudy.			
	64		S.	Cloudy.			
	59		S.	84			
	61		N.	Cloudy.			
	65		S.	86			
	65		S. W.	84			
	65		S. W.	86			
	65		S. W.	Cloudy.			11.70

(Signed) SHEIKH HINGUN,  
Native Doctor on duty at Shillong.

From Major W. RICHARDSON, President, Committee of Survey on Shillong, to Major GARDEN, Deputy Assistant Quarter Master General of the Army,—(No. 20, dated Cherra Poonjee, the 10 March 1861.)

IN continuation of my letter No. 146 of 15th September last, I beg to inform you that I visited Shillong on the 21st ultimo; and as rain has now fallen over these hills, I do not think it necessary to repeat my visit.

The stream alluded to in my committee report, was dammed up at a spot  $\frac{3}{4}$  of a mile above its out-fall, and a spout placed, so that we could measure the quantity of water passing, which we found to be five (5) gallons per second, without altering the level of the water inside the dam during the 24 hours I staid there; and the villagers who built the dam, reported that it had remained in the same state for ten days. Lieutenant Colonel Reid from Assam passed that way 4 days ago, and found the water up to the top of the dam, as when I was there.

A well has been dug near the huts, but the water having drained through boggy soil was discolored and looked badly, though it had no unpleasant taste. The well was 10 feet deep, with 5 feet of water.

*Report on Shillong by E. C. THORP, Esq., M. D., Surgeon, East Indian Regiment,*  
*(dated Dacca, the 21st May 1861.)*

IN the month of July 1860, in accordance with orders received from Major Richardson, commanding the Sylhet Light Infantry, I proceeded to Cherra Poonjee to join a committee ordered to assemble and report on the suitability or otherwise of Shillong as a Sanatorium for European troops.

Shillong is situated in the Cossiah Hills, about 30 miles north of Cherra Poonjee, and about 40 or 50 south by east from Gowhatty in Assam, at an elevation of 5,600 feet above the sea. The portion most suitable for a cantonment is to the west of the Shillong peak, and consists of a gently undulating country about two miles long by a mile in width.

The access from the Sylhet side is easy. Boats can go to the foot of the hills or within a short distance all the year round; and from the foot on the hills to Cherra Poonjee, a distance of 10 miles, there

is a good paved road the whole way (elephants are constantly employed on this road.) From Cherra to Moflung, a distance of 20 miles, the paved road continues; and from the latter place to Shillong, 10 miles, there is a hill road even now practicable for horses and mules. From the Assam side, the Natives say the access is easy, but that the passage through the jungle at the foot of the hills in the rainy season is dangerous. A loaded cooly can with ease go from Shillong to Gowhatty in  $2\frac{1}{2}$  days. If a road were made the distance could be done in six or eight hours. A stream of capital water runs through the site selected, said by the Natives never to dry up; and in many places wells might be sunk without any difficulty.

The soil is a strong clayey loam, and very fertile, the Natives getting two crops a year with but little cultivation. The apple and plum grow wild, and I have no doubt but that all the English fruits would thrive there. At the time we visited it, it was a perfect carpet of flowers: the blue Hare Bell and the yellow *Potentilla* mixed with the dark purple Larkspur, and the many-colored Balsams, were in great profusion, and many other English wild flowers.

The temperature varied from  $63^{\circ}$  at sunrise to  $73^{\circ}$  at 4 P. M., which was the warmest time of the day, and I do not think that at any time during the months of July, August, and September, the thermometer ever stood above  $74^{\circ}$  in the shade.

The quantity of rain which falls at Shillong when compared with the fall at Cherra Poonjee, is very small. In July, at Cherra, 160 inches of rain fell,—at Shillong only 17. In August, 140 at Cherra, and only 40 at Shillong.

There would be no difficulty in procuring building materials. Stone can be procured close by in any quantity, and the soil makes very good bricks—lime and coal within 20 miles—slate at 10 miles. Timber for building would have to be brought up from the forest on the Assam side, distant about 20 miles.

Bullocks and pigs are good and plentiful, but there are no sheep at present, although I doubt not they would thrive with care. We visited a large market held at Yeodo, about 3 miles from Shillong, and found it well supplied with rice, beef, pork, potatoes, dried fish, and spirits. The supply of cloth, &c., was also good.



I consider Shillong to be one of, if not the best site for a hill station I have seen. There is plenty of level ground for a parade and cricket ground—there is not too much wood, and it is free from jungle, and convalescents might take plenty of exercise without exhausting their powers by climbing steep hills.

I have no doubt but that an experimental farm would succeed.

From the Secretary to the Government of India, Military Department, to the Quarter Master General of the Army,—(No. 1098, dated Fort William, the 29th July 1861.)

WITH reference to your letter No. 819C, dated 17th ultimo, submitting a committee report and other correspondence relative to the location of European troops at “Shillong” in the Cossiah Hills, I am directed to acquaint you, for the information of His Excellency the Commander-in-Chief, that although from the papers in question and other reports received from the Bengal Government, Shillong appears to be, in respect of climate and country, an excellent site for a station, the Right Hon’ble the Governor General in Council still thinks, that to post a whole regiment there would be a waste of our European strength, and that a Sanatorium giving accommodation for three or four companies is all that should be attempted.

2. For the current year, indeed, His Lordship in Council desires me to observe that the expenditure of any more money than has already been allotted to military buildings is not possible. The Bengal Government will, however, be requested to keep the question in view for the next budget, confining their buildings, in the first instance, to comfortable temporary huts for two companies, and gradually improving the roads, &c., by which it is approached.

From the Secretary to the Government of India, Military Department, to the Secretary to the Government of Bengal, Public Works Department,—(No. 1100, dated Fort William, the 29th July 1861.)

WITH reference to your letters and their enclosures, which contain much valuable and interesting information respecting the suitability of Shillong in the Cossiah Hills as the site of a Sanatorium and European colony, I am directed to transmit, for the information of the Hon’ble the Lieutenant Governor of Bengal, copy of my letter

No. 1098 of this date, to the Quarter Master General, communicating the opinion of His Excellency the Governor General in Council on the subject.

2. His Honor will observe that though unable to sanction any further expenditure this year, His Excellency in Council is desirous that the question may be kept in view for the next budget, the first efforts being directed to building comfortable temporary huts for two companies, and to improving the access to the place.

3. The opening of the communication with Gowhatty, will, His Excellency in Council observes, be valuable ; and should the site on trial prove as advantageous as it promises, a detachment may be kept there, a small military station being, as His Honor intimates, indispensable as a nucleus, or for the protection of the colonists, should the proposal for a European colony be carried out.

From Sir G. COUPER, Bart., C. B., Secretary to the Government of the North-Western Provinces, to Major General Sir R. J. H. BIRCH, K. C. B., Secretary to the Government of India, Military Department,—(No. 3092A, dated Camp Jhansie, the 11th December 1861.)

I AM directed by the Hon'ble the Lieutenant Governor to acknowledge the receipt of your letter No. 952F, dated the 16th February 1860 ; and in forwarding to you, for the consideration of His Excellency the Viceroy in Council copies of the papers regarding Hill Sanatoria in these provinces, I am to refer you to the communication from this office, No. 485A, dated the 28th of March 1861, as explanatory of the unfortunate delay which has occurred in the submission of the information required on that subject.

2. The enquiries of the Government of India in the letter above cited, are divisible into three parts.

I. As to the value of existing Sanatoria, and the possibility of making better use of them.

II. As to the character of existing Sanatoria, and suggestions for their improvement, whether in respect of sanatory measures of giving means of occupation and amusement to the invalid and convalescent soldiers, or as to roads of access, &c.

III. As to the most suitable places for the establishment of new Sanatoria, &c.

3. Within the limits of these provinces there are at present two Sanatoria, the one at Landour in Mussoorie, the other at Nynce Tal. Almorah, though in the Kumaon Hill, and more or less resorted to by invalids, is rather a military station—where Native troops are posted for the defence of the province—than a proper Sanatorium.

4. To Mussoorie and Landour, the letter dated the 20th July 1861, from Mr. Williams the Commissioner of Meerut, (enclosure No. 4) has reference, as well as for the most part enclosures Nos. 5 to 7, being letters from Mr. Mackinnon who has resided at Mussoorie or Landour for 27 years, and from the Deputy Inspectors General of Hospitals of the Meerut and Agra Circles.

5. In regard to the first point, *viz.*, the value of Landour as a Sanatorium for European troops, the Lieutenant Governor would beg to refer to Dr. Murray's letter (enclosure No. 6.) This Officer has had very considerable experience of the climatic conditions of this Sanatorium, and his general remarks on the features which should be sought for in a Sanatorium, no less than the results of his practice, will be found interesting and possibly of some value. There is no question, His Honor apprehends, that the climate is infinitely superior at Landour to the best climate that is known in the plains of India; and that though its influence is unfelt in cases of organic disorders, it does give the greatest relief to those who have been prostrated by illness in the plains, and brings about recovery in numberless cases which would otherwise prove fatal.

6. The disadvantages of the Landour dépôt, as set forth in these papers, consist principally in its confined area; its exposed position; the distance and scarcity of water; the entire absence of level ground for military purposes and manly amusements; and the very inferior nature of the accommodation which the "bungalows" offer to the invalids.

7. And this brings the Lieutenant Governor to the second point, *viz.*, the possibility of extending and improving this Sanatorium. A good deal of information on all the above points will be found in paras. 21 to 27 of the letter from the Commissioner of Meerut, (enclosure No. 4) in Dr. Wilkie's and Dr. Murray's letters (enclosures Nos. 5 and 6.) and in paras. 2 to 8 of Mr. Mackinnon's address (enclosure No. 7.)

8. At present it would seem no more than 200 men can be received in the Landour dépôt; but neither its extension nor its material im-

provement appears to be practicable, except at a very large outlay. The Landour Hill is not the property of Government. The building ground is very limited in extent; and it would be only by the purchase of the private estates which have been formed, that the requisite space could be acquired on the present site of the dépôt. Of the cost of this no estimate has been received; but house property in the hills is becoming more valuable every year, and heavy prices would be demanded.

9. Again, extension in the direction of Mussoorie, even if it were not in itself unadvisable, would be practicable only by the same expensive measure. "Every bit of ground in Mussoorie," writes the Commissioner of Meerut, (paragraph 33,) "has been taken up, and almost every available site has been built on. In the centre part of the station the houses are crowded together nearly as close as they can be."

10. But even though the whole of the Landour Hill should be bought up, with a view to the extension of the cantonment, the existing objections to it, *viz.*, its very exposed position; (as particularly noticed by Mr. Mackinnon) the difficulty and expense of obtaining full supplies of pure water; the scarcity and comparative dearness of fuel; the want of level ground for purposes of duty and amusement, would still remain; and the only advantage gained by probably a very large expenditure, would be that a larger number of convalescents might be received, while little or nothing apparently could be done to bring about the conditions which should be found in every Hill Sanatorium.

11. Mr. Williams, the Commissioner of Meerut, it is true, throws out suggestions in paragraphs 25 and 26, for removing the greatest of existing objections, *viz.* the scarcity of water; and if the Government of India think fit, the scheme might be examined without much expense. But Mr. Williams himself seems hardly to believe in its practicability, and it is quite certain, on the other hand, that the cost of its execution would be heavy.

12. There is one other evil attaching to Landour which has not yet been noticed: this is the difficulty of approach to it, and the heavy expense which is thereby laid on the Government in the item of portage, for conveying stores, &c., to the dépôt. A brief description of this road will be found in the 9th *et seq* paragraphs of Mr. Williams' letter (enclosure No. 4,) and it will be seen at once that the improvement of the present line is hopeless. The Lieutenant Governor thinks that the Government

should at once undertake the construction of a road which shall be travel-  
lable by carts from Rajpore to Landour; and he feels satisfied that this  
might be accomplished for a sum not exceeding 50,000 rupees, and that  
the whole outlay would be repaid in a very few years by savings on the  
item of portage only.

13. The sanatory arrangements at Landour are said to be "satis-  
factory," but they are not described; and His Honor is disposed to re-  
ceive the assertion with some hesitation, when he reads what is stated by  
Mr. Williams in paragraphs 35 to 38 of his report, relative to the ex-  
treme filthiness and offensiveness of Mussoorie. It is difficult to con-  
ceive that if the conservancy of Landour were satisfactorily conducted,  
the Municipal Commissioners of Mussoorie would not long ago have  
adopted the system there observed, whatever it may be. As mentioned  
in another of the enclosures, to be noticed below, Dr. Clark, the Inspector  
General of Prisons, has drawn out an excellent scheme of conservancy  
for the Nynce Tal settlement; and the copy of a paper which he has kind-  
ly furnished to the Lieutenant Governor is enclosed with a recommen-  
dation that its observance may be enforced in Landour, whether there  
be any intention of extending that Sanatorium or not. In the event of  
its enlargement, the introduction of the plan will be all the more ad-  
visable. His Honor purposes sending a copy of it to the Municipal  
Commissioners of Mussoorie, with his recommendation that they adopt  
it at once, in preference to that which Mr. Williams seems disposed to  
advocate. It appears to the Lieutenant Governor that the only effect of  
his plan would be to concentrate on spots too near to human dwellings,  
the masses of offensive matter which are now scattered over a large surface,  
and gradually though slowly deodorized by exposure to the elements.

14. The "bungalows" in which the convalescents are accommo-  
dated, are very generally condemned, especially by Dr. Wilkie, who states  
that they are very "indifferent and scattered". This is a point for the  
decision of the Government of India, on considerations financial and  
hygienic; but His Honor would not join in Dr. Wilkie's recommendation  
that two-storied barracks should be built on the elevated and exposed hill  
at Landour. More than once, one or other of the existing buildings has  
been struck by lightning, and the more lofty two-storied barracks would  
hardly escape. Lightning conductors even would not, the Lieutenant  
Governor apprehends, be a complete protection.

15. It only remains to notice the 3rd point, *viz.* the most suitable places for the establishment of new Sanatoria in this range of mountains; and this subject is treated briefly in paragraphs 28 to 31 of Mr. Williams' report, and in paragraphs 9 *et seq* of Mr. Mackinnon's letter. None of the sites indicated by the former appear to be eligible. The compensation to be paid either for the "brewery" or the "park" estate would be enormous, and even then the site would be objectionable. The presence of a military depôt in immediate proximity to the private dwellings of a mixed community, His Honor apprehends, would be considered extremely objectionable, as regards discipline and control over the invalid and convalescent soldiers; while it is certain that on the other hand the measure would be very strongly resisted by the community. The Budraj Hill is out of the question, owing to the distance and scarcity of water.

16. The suggestion put forth by Mr. Mackinnon may be thought to deserve examination. He would abandon the present site altogether and remove the depôt to a spot on the north of the Landour Hill. The Lieutenant Governor is not in a position to offer any opinion on this project, being unacquainted with the locality; but as the present Sanatorium has many defects which cannot be got rid of, and as nothing but a very large outlay will suffice to effect the improvements that are required, His Honor would recommend that the site indicated be examined by a committee of competent officers, who should be required to report upon all material points, according to detailed instructions to be furnished by the Government of India.

17. In regard to the other Sanatorium in these provinces at Nynce Tal, a very full and exhaustive report from Mr. Strachey of the civil service, is forwarded. This Officer was for many years employed in the province of Kumaon, and has been assisted in the compilation of this paper by two other gentlemen, Mr. J. H. Batten of the civil service, and Major Henry Ramsay the present commissioner of the province, the better part of whose lives have been passed in the hills of Kumaon and British Gurhwal. There are none now living who possess a more complete knowledge of the hills in question, of their climate, their geology, and the peculiar characteristics of particular localities, than do these gentlemen; and His Honor can venture to add nothing to these facts or to the inferences which they have drawn from them. So far as the Lieutenant Governor's personal knowledge of Almorah, Nynce Tal, and the adjacent hill of Kaila Khan, on which stand the existing bar-

racks, extends, he can vouch for the accuracy of what is stated in the report; and the opinions which they have expressed have his general concurrence. The authors of this report write, and are entitled to write, on all the subjects discussed in the report, with an authority which the Lieutenant Governor cannot assume,—and any thing that he might add would be comparatively valueless.

18. But it may be proper for the Lieutenant Governor to state; 1st, that Dr. Clark's conservancy scheme as described in the enclosure No. 8, has been sanctioned, and is at the present moment in course of execution; and 2nd, that the cart-road from Huldwance to Kaila Khan referred to in the report, is also in progress under the direction of the commissioner, Major Ramsay. This latter has been carefully surveyed, and there is no question but that it will be successful at no distant date.

19. The enclosures, Nos. 2 and 3, from the late commissioner of Jubbulpore, and their sub-enclosures (Nos. A to F) relate to sites for Sanatoria at Puchmurree and Muthoor, on the range of hills dividing the province of Nagpore from the districts of the Saugor and Nerbudda territories, and will be read with interest. These latter have lately passed away from the Lieutenant Governor's jurisdiction, and he need not offer any expression of his views. But it may be mentioned that in connection with matters relating to the management of the forests, Captain Pearson sent a description of Puchmurree, which inclined His Honor to think that it might very probably prove to be a suitable place for a small Sanatorium; and that more particular observations of the climate, the rain-fall, the supplies of water, the geological formation, &c., might be valuable. Captain Pearson was accordingly requested to take up his residence there for a time, to examine thoroughly the hill, its springs, its soil, its approaches, &c., and to keep up a regular series of meteorological observations during his stay; this, Government has, however, no information as to what has been done in the matter.

20. There can be no question that if a Sanatorium can be established either at Puchmurree or at Muthoor, it will be extremely valuable both to the European troops at Jubbulpore and Saugor, and to the neighbouring community at large. These districts are so far removed from the sea, as well as from the Himalaya and the Neelgherry Hills; and the difficulties of travelling at certain seasons of the year are so great, that a Sanatorium within reach would be an immense acquisition.

From J. STRACHEY, Esq., Civil Service, to Sir G. COUPER, Bart., C. B., Secretary to the Government of the North-Western Provinces,—(dated Nynce Tal, the 1st September 1861.)

I HAVE the honor to acknowledge the receipt of your letter No. 502A, General Department, dated the 28th of March 1861, with its enclosures, calling for my opinion on the subject of sanatory establishments for European troops in the hills.

2. My personal knowledge of the Himalaya has been confined almost entirely to British Gurhwal and Kumaon, in which I held appointments for several years. Geographical limits of present enquiry. These districts lie between the Ganges and Sardah Rivers; and I propose in the remarks which I am about to make, to refer only to that portion of the mountains which lies within these limits. The distance from Hurdwar on the Ganges to Burmdeo on the Sardah is about 140 miles. Sanataria in this part of the hills may be considered available for the military stations of Rohileund, Oude, and of the Doab below Meerut. I shall endeavour to describe in the first instance the general conditions which a good Hill Sanatorium ought to possess, and shall then show, so far as I am able, to what extent those conditions can be obtained in these mountains within the geographical limits which I have just stated.

3. Hill Sanataria for European soldiers may be of two kinds; those specially intended for invalids whose health has suffered in the plains, and those intended for Sanataria of two kinds. the permanent cantonment of troops. Although the objects aimed at are different, we may consider so far as these mountains are concerned, that the local and climatal conditions which have to be fulfilled are in both cases almost the same.

4. There has been much discussion regarding the advantages and the defects of the climate of these mountains for European troops. Such questions when they deal with matters of nostogical detail, belong to the province of medical science, and it would be out of place if I were to speak of them: but it is evident that on the general question much has been written which is altogether irrelevant and useless. People still talk as if the benefit of a hill climate for European soldiers were doubtful. During the last forty years ample experience has been gained of the



climate of the hills, and the time has long passed for discussing the general fact of its advantages. It must be admitted to be very far from being perfectly adapted to European constitutions, but it is equally certain that the benefits are immense, which in the majority of cases it holds out to those whose health has suffered from the tropical climate of the plains. It appears to me irrational to suppose that a climate which in spite of all defects has been proved by long experience to be immeasurably superior to any thing obtainable in the plains, and which is at least comparatively speaking, good for all other classes of Europeans, can possibly be any thing else than good for European soldiers. If the health of soldiers in the hills is less good than that of other Europeans, there can only be one reason : the arrangements which have been made for them must be bad. Crowded and unventilated barracks, want of proper conservancy, and other neglect of the laws of sanatory science, will produce the same results here which they produce in England, and in the most

\* Selections from records of the Government of India, Military Department, No. 1, dated March 1861.

healthy countries in the world. It is clear from the printed papers on sanatory establishments\* that the climate of the hill stations at which European troops have been posted, has very seldom had a fair trial. Page after page we read of barracks badly built and badly ventilated ; of bad drainage and bad conservancy.

I think, therefore, that we may safely assume that those climates which have been proved to be the most suitable for European constitutions generally, are those which we ought, if possible, to choose for Sanatoria for our soldiers.

##### 5. Within the actually accessible parts of the Kumaon and Gurhwal

Elevation above the sea the chief cause of variety of climate in these mountains.

Himalaya, elevation above the sea is the only very important cause of variation of climate. It is true that on the ranges that immediately overhang the plains, the rain-fall during the months of July, August, and September, is much heavier than it is in the interior of the province, nevertheless the actual differences of climate at similar elevations are not very great, and this is more especially true at elevations of 6,000 feet and upwards. Thus if we compare the Gagur and Binsur ranges, the former close to the plains, and in which Nynce Tal is situated, and the latter thirty miles nearer to the snowy peaks, we shall find at the same elevation, at the same season, little difference of temperature or

even of humidity, although the quantity of rain that falls upon the Gagur within any given time may be much larger. The climate of Binsur during the rainy season is almost equally damp. In these mountains the quantity of rain is, as Dr. Hooker has observed, "little indication of the humidity of the climate; for though in the interior valleys very little falls at elevations corresponding with those which are deluged on the

\*Encyclo. Brit., Art. "Himalaya."

outer ranges, the fogs and drizzle which prevail, and which are not measured by the rain gauge, sometimes obscure the sun's rays for many days

in succession."\*

During eight or nine months of the year there is practically no difference between the two climates. This has been proved to be the case, not only by actual observation of the meteorological phenomena but by the great similarity—it might almost be said identity—of the vegetation.

With regard to general healthiness, it may be stated without hesitation that the experience of many years has shown that the outer ranges are in no way inferior to those that are more distant from the plains.

#### 6. It is desirable to notice that in one important respect Kumaon

Impossibility in this province of avoiding the periodical rain.

and Gurhwal differ from those parts of the Himalaya which lie to the north-west of the sources of the Jumna: here there is no country

like Kumaon or Cashmere, lying beyond the first of the snowy ranges of the Himalaya, possessing an admirable climate, and protected by the mountains, that form its southern limit, from the influence of the periodical rains of India. Although it may be doubted whether Sanataria for European troops can ever be usefully established at so great a distance from the plains of India, yet there is no doubt that the advantages of climate presented by countries so situated, are very great, and this is a fact which ought not to be forgotten. In the Kumaon and Gurhwal Himalaya nothing of the kind exists. When we cross the water-shed of the snowy range, we find an almost uninhabited and uninhabitable country, little better than a desert, with a climate and vegetation approaching those of the Arctic regions.

7. Experience has shown that the best climate in these hills is to be found at elevations between 5500 and 7500 feet above the sea. Below 5500 feet the climate is too hot in summer, while above 7500 feet it is too cold and damp for a great part of the year. Altogether the most suitable elevation for the permanent residence of Europeans is from about 6000 to 7000 feet. This it appears to me is an indisputable fact. Particular constitutions and particular diseases may require of course a colder or a warmer climate.

8. It appears unnecessary that I should enter into much detail regarding the peculiar characteristics of the Himalayan climate; nor in the almost total absence of books and records can I attempt to speak with scientific accuracy. A few remarks may however not be useless.

In Kumaon the temperature as we ascend diminishes  $1^{\circ}$  for about every 400 feet of elevation. At 5500 feet above the sea, the mean annual temperature is about  $59^{\circ}$ ; at 6500 feet about  $56.2^{\circ}$ ; at 7500 feet about  $53.7^{\circ}$ . The mean temperature of the hottest month at an elevation of 6500 feet, is about  $67.5^{\circ}$ , and that of the coldest month about  $44.5^{\circ}$ . These temperatures are probably somewhat higher than those at similar elevations in the Sikkim Himalaya, and perhaps a little lower than in the more western portions of the range, the effect of the diminished rain-fall as we travel towards the west, being more than sufficient to counteract that of higher latitude. According to Dr. Hooker the mean temperature of the year at an elevation of 7500 feet in Sikkim, is about  $50^{\circ}$ ; that of the hottest month  $62.7^{\circ}$ ; and of the coldest month  $40^{\circ}$ . I have not the means of comparing these temperatures with those of the hill stations in the more western portions of the range, but the differences at similar elevations are inconsiderable. The average annual rain-fall at Darjeeling, at an elevation of 7000 feet, appears to be about 130 inches. At Nynce Tal at the same elevation, it is about 100 inches. At the stations in the outer ranges further to the west, it is somewhat less. The following table will give the means of comparing the temperatures above stated with those of places in Europe.

Names of places.	Mean Temper- ature of the year.	Mean Temper- ature of hot- test month.	Mean Temper- ature of coldest month.
	Degrees.	Degrees.	Degrees.
London ...	50·36	64·40	37·76
Paris ...	51·08	65·80	36·14
Milan ...	55·76	74·66	36·14
Marseilles ...	59·00	74·66	44·42
Rome ...	60·44	67·00	42·26

The difference between the climate of the Himalaya and that of Europe is, however, greater than these figures would seem to show. It cannot be doubted that, admirably as these mountains are adapted for Sanatoria, their climate is no complete substitute for that of Europe. "It is certainly" says Major Madden, one of the most competent of Himalayan observers, "less salubrious than is commonly supposed, and seldom so cool as to admit of European out-door labor \* \* \* \*. Such too is the power of the sun at *all* elevations, from April till October, between 9 A. M. and 4 P. M., that Europeans can rarely with impunity brave its rays. The mean annual temperature of 7500 feet elevation is nearly that of London; but the fact that few of the trees indigenous at that altitude can stand an English winter, points to a signal difference of conditions in the distribution of Himalayan heat and moisture \* \* \*. The sun's rays strike vertically with intolerable power, augmenting in the ratio of our ascent, so that one is absolutely scorched while walking on a glacier. What a contrast also between the generally serene brilliant sky and extremely dry atmosphere of the Himalaya during eight or nine months of the year, and the cloudy canopy which so generally rests over the British Islands! The sun's arrival at the tropic of Cancer is marked here by that of the rainy season, when the previously dry atmosphere is suddenly and for three months saturated with moisture \* \* \*. It appears chimerical to hope that the Himalaya can ever maintain an independent body of colonists, such as might supersede the necessity of

drawing recruits from Europe, or such as on any emergency could be brought down to act in the defence of the Lower Empire. This is a very different question from that of the fitness of the mountains for sanatory settlements, occupied by those in the service of Government, and whose means of subsistence are drawn from the plains,—that indeed is no longer a question.”

*(Journal of Asiatic Society, May 1848.)*

9. In determining what places are adapted for Sanatoria, there are of course many points to be considered besides temperature : there must be in the first place a good soil and good natural drainage. For this reason, as well as for many others, open but not unsheltered hills are generally to be preferred to valleys. With regard to geological structure, there is at least in the more accessible portions of these mountains generally little choice. The outer ranges in Kumaon, after leaving the sandstone ridges which border on the plains, consist almost always of argillaceous or quartzose schists, or of limestone : the former is usually to be preferred. The surface drainage is generally defective in the limestone formations, and the water is probably not so good.

10. An ample supply of water is of the utmost importance. Unfortunately this is a condition extremely difficult to obtain. In the outer ranges of the Himalaya in this latitude, there can hardly be found a hill possessing a sufficient supply of water for large sanatory establishments.

11. The hills chosen for a Sanatorium should be well wooded. It is desirable to notice this point prominently, because the mischief has been great which has been caused both in the hills and in the plains by the ignorant notion which is so commonly prevalent that trees are prejudicial to health and a source of malaria. I do not mean to deny that a forest may be too dense. Free circulation of air is of course necessary, and every one will admit that low jungle and rank vegetation are objectionable.

But it may confidently be affirmed that in these mountains the unsparing destruction of trees which is frequently recommended and sometimes practised, is, on purely sanatory ground, a great mistake. It is strange that people who have received an education in which they

may be supposed to have learned at least some of the rudiments of science, should so commonly be ignorant of the fact that trees produce, as a general rule, most important and beneficial effects upon climate, especially where animal exhalations are abundant. This is more particularly the case when, as in these mountains, the air during the greater part of the year is extremely dry. The importance of shade must also not be forgotten. The heat of the direct rays of the sun is far greater at these elevations than it is in the hottest parts of the plains; a fact little known, but one that ought to be borne in mind. Nor must the injury caused to the beauty of the scenery by the unnecessary destruction of trees be overlooked, even if these questions be considered from a purely utilitarian point of view.

12. This and other requisites for a good Sanatorium can hardly ever be obtained in these mountains except in the immediate vicinity of ranges of a greater elevation than that which is required for the Sanatorium itself. An isolated ridge with an elevation of 6500 feet, is almost invariably bare of wood, deficient in water, and with no beauty of scenery. Mountains on the other hand of the same elevation forming part of a range of 8000 feet and upwards, possess in a great measure the vegetation and the other advantages of the higher hills. It is important also, that there should be at a Sanatorium as great a command as possible of different climates. This can only be satisfactorily obtained when higher mountains than those required for ordinary permanent residence are within easy reach.

13. A southern aspect at elevations exceeding 6000 feet, is generally to be preferred; but it must be remembered that the southern faces of the ranges that immediately overhang the plains, are exposed to a larger fall of rain, and that during the rainy season they are enveloped in clouds more frequently than the northern slopes of the same mountains. The actual excess of humidity in the former case is, however, not so great as is often supposed. The remarks made in paragraph 5 of this letter are applicable to this part of the subject.

14. Level ground is an important desideratum, but unfortunately it can seldom be found in these mountains in conjunction with the other necessary conditions.

15. Whenever it may be practicable, sanatory establishments for troops ought to be situated in the vicinity of existing stations, not in the midst of uninhabited mountains and forests, where the men can find nothing to interest them, and where no novelty or excitement is possible. If soldiers have opportunities of seeing and associating with other people going about their ordinary occupations and amusements, they are much less likely to feel the monotony and irksomeness of barrack life, which are such fruitful sources of vice and disease. These are among the chief causes of the dislike which our soldiers now generally feel for Sanatoria in the hills.

16. Easy accessibility and vicinity to the plains is a matter of primary importance. This is equally necessary for a sanatory establishment and for a permanent station for European troops.

For invalids such accessibility is one of the first essentials, on account of the extreme difficulty and fatigue of travelling in the hills, while stations for troops must, for obvious military reasons, be ordinarily as near the plains as possible.

On grounds of economy also, this must be considered of the utmost importance. The difficulty and expense of carrying supplies into the interior of the hills would be so enormous that it may be safely asserted that every station for any considerable number of European troops ought to be accessible at all seasons by a good carriage road from the plains. Considering the scanty population of the hills and the extreme difficulty of procuring the means of transport, this appears as important on military as on economical grounds.

17. The above seem to be the chief desiderata for a Sanatorium in these mountains. Assuming, for the reasons stated in the 5th paragraph of this letter, that the climate of the exterior ranges is as suitable as that of the mountains in the interior of the province, it appears that the most perfect Sanatorium would be one which possessing all other obtainable advantages, should be situated on the first range that rises above the plains.

Above conditions how far obtainable in Kumaon and Gurhwal.

18. I proceed to show how far and in what localities these conditions are obtainable in the mountains of Kumaon and British Gurhwal.

19. It must be noticed that here, as in many other parts of the Himalaya, the Siwalik range of hills often forms a distinct ridge of no great height, rising immediately above the plains, and separated from the principal chain by the broad flat vallies called doons. Wherever this is the case, or whenever the inferior ranges have a larger development than usual, the difficulty of approaching the higher hills is much increased. The distance to be traversed becomes greater, and the lower hills and doons are usually very hot and unhealthy. It sometimes happens, on the other hand, that the Siwalik Hills and the doons are suppressed, and that the higher ranges rise immediately out of the plains. These are generally the most favorable situations for sanatoria. Occasionally, no doubt, there may be an exception to this rule when the doon at the foot of the hills is healthy and easily accessible. One of these exceptions is found in the Dehra Doon, the central portion of which being cultivated and comparatively healthy, forms no serious obstacle in approaching the Mussoorie Hills;—another probable exception is the Kota Doon in the neighbourhood of Dechouree, ten miles to the west of Nynce Tal.

20. Between the Ganges and the Kosee Rivers, or along the whole base of the Himalaya in British Gurhwal, there are almost always either doons or entanglements of low ridges, and when these are got rid of, the main ranges have nowhere a sufficient elevation for Sanatoria, except at a distance from the plains of twenty of thirty miles. Even when we find the requisite climate, the other necessary conditions are not fulfilled. It may be confidently stated that between the Ganges and Kosee there are no mountains adapted for sanatory establishments for soldiers from the plains. This need not be regretted, because none of the stations for European troops are so situated that there would be any convenience in having a Sanatorium in British Gurhwal.

Siwalik range in British Gurhwal.

. No mountains in British Gurhwal adapted for sanatoria.



21. On the left bank of the Kosee in Kumaon, the Gagur range commences. This contains higher mountains and finer scenery than are found in almost any known part of the Himalaya at so short a distance from the plains. The elevation of the peaks of the Gagur generally exceeds 8000 feet. Cheenur the highest point, close to Nynce Tal, rises to 8700 feet above the sea. We find in this range, and here alone, between the Ganges and the Sardah, almost every thing required for a Hill Sanatorium.

22. The portion of the Gagur which lies to the west of Cheenur, of which the principal peaks are Soonchulia and Budhan Dhoora, is a magnificent range of mountains; but it is very deficient in water, and it is not easy of access on account of the doons and the ridges of low hills which separate it from the plains. It is only when we approach Kala Dhoongee, where the present road to Nynce Tal begins to ascend, that we get rid entirely of all doons and other obstacles. The Nynce Tal Gagur may be said to rise straight out of the plains. From the water-shed of the range, varying in elevation from 8700 to 7400 feet above the sea, the distance in a straight line to the plains never exceeds a few miles. From Nynce Tal to Kala Dhoongee the distance by the present road is about 14 miles. From Nynce Tal to Bhumowree above Huldwanee where the plains may be considered to commence, the distance is about twelve miles.

East of Nynce Tal the Gagur begins to recede from the plains. The average elevation of the range remains nearly the same. The Sutchoola peaks, about ten miles from Nynce Tal, are nearly twenty miles distant from the plains; and we may consider this to be about the eastern limit of the tract which is likely to offer the most suitable situations for sanatory establishments for European troops.

23. Beyond this to the eastward, although the continuation of the Gagur towards Debee Dhoora is a fine range of mountains, the distance from the plains becomes too great. There is also this serious objection that between Sutchoola and the Sardah, although there are no doons properly so called, the higher ranges are separated from the plains by the deep vallies of the Golah and Ludheea Rivers. These valleys run parallel

to the direction of the chain ; their elevation is very little ; they are extremely hot and unhealthy ; and there is a rugged ridge of considerable height separating them from the plains. Thus, for example, in going from the plains to Lohoo Ghat, situated on the north side of the Kanadeo range, which is in fact a continuation of the Gagur, we have to ascend for a distance of eight or ten miles to a pass 3700 feet above the sea, then to descend into the pestilential valley of the Ludheea, the elevation of which is only 1500 feet, and then again to ascend the main ridge of Kanadeo, the crest of which is about twenty miles distant from the plains.

I shall have again to speak of Lohoo Ghat, which has been sometimes strongly recommended as a station for European troops. It will be seen from what has just been said, that in some important respects its situation is far from convenient for a Sanatorium.

24. In considering the question of accessibility of any place suitable for a Hill Sanatorium from the plains, it is not sufficient to think only of facilities of approach after the hills have been entered : it is necessary also to consider the obstacles which may exist in the plains themselves, and whether the position of the Sanatorium is convenient with regard to those stations in the plains, for the benefit of which the Sanatorium is principally required.

Between the Ganges and the Sardah there is only one serious obstacle in approaching the hills : this is the belt of Terai and forest, which extends along the foot of the mountains. The climate of this tract is so excessively unhealthy for a great part of the year, that it is a matter of the utmost importance that all risk of exposure to it should be as far as possible avoided. The Terai becomes worse and more pestilential as we travel eastward ; the elevation above the sea rapidly diminishes ; the soil and the climate become wetter ; the vegetation more rank ; the cultivation and clearings become less ; and the population more and more scanty. In the Bijnore district, the Terai is to a great extent suppressed ; but we can gain nothing from this, because as I have before stated, there are no mountains in this portion of the outer Himalaya fit for Sanatoria. The worst part of the whole Terai, between the Ganges and Sardah, is that near the latter river. The climate of Burmdeo

where the Sardah leaves the hills, on the road to Lohoo Ghat, and that of the neighbouring country, is, except during the cold weather, almost as bad as possible. Burmdeo is only about 850 feet above the sea.

25. The least unhealthy portion of the Kumaon, Terai, and forest, is that in the vicinity of Kala Dhoongee and Huldwanee, immediately below Nynee Tal. No part of the whole tract has been so extensively cleared and reclaimed. This is more particularly the case at Huldwanee on the road from Nynee Tal to Bareilly. The comparative healthiness of the climate of Huldwanee has been completely proved by experience. The permanent inhabitants suffer little; and in 1857 and 1858 when considerable numbers of troops were quartered there during the unhealthy season, there was little or no sickness. Huldwanee is surrounded with fine cultivation, which is constantly and rapidly increasing in extent; and the canals which Major Ramsay has constructed, afford the advantage almost unknown in any other part of this tract, of an ample supply of wholesome water. Huldwanee is 1550 feet above the sea. Bhumowree at the base of the mountains, three miles above Huldwanee, has an elevation of 1800 feet.

Kala Dhoongee, although its climate is not equal to that of Huldwanee, possesses many of the same advantages: the cultivation is extensive and is increasing, and the establishment here of the iron works will tend greatly to the improvement of the place and of its climate. Its elevation is 1400 feet above the sea.

Kala Dhoongee and Huldwanee are the nearest and most easily accessible points at the foot of the Kumaon Hills from the stations of Moradabad and Bareilly, and from those of the Doab and Oude. From Moradabad to Kala Dhoongee the distance by the road is 47 miles; from Bareilly to Huldwanee the distance in a straight line is 58 miles; while to Burmdeo it is 66 miles. From Pilibheet to Huldwanee the distance is 42 miles, and to Burmdeo 38 miles.

26. We thus find a remarkable coincidence of advantages in the ranges of the Nynee Tal Gagur: the mountains are higher; they are closer to the plains, and more easily accessible. The country at the foot of the hills is better cleared and occupied; the climate of the Terai and forest

Advantages in approaching the hills by Huldwanee or Kala Dhoongee.

Coincidence of advantages in Nynee Tal Gagur.

is less pestilential ; the military stations of Rohileund and Oude are less distant than in any other situation between the Ganges and Sardah, which could be thought of for a Sanatarium.

27. Another point must be noticed which will hereafter become of great importance. Every one acquainted with the facts will admit that the construction of a railway through Rohileund is only a question of time, and that this time cannot be very distant. From Khoorja or whatever place in the Doab may be chosen as the point of junction with the main line, the railway will certainly pass through Moradabad, and there can be little or no question that it will be continued to Kasheepoor, and be connected with the iron works at Dechouree and Kalla Dhoongee. There is little doubt that before many years have elapsed there will be railway communication to within 20 miles of the base of the hills below Nynee Tal, and there is no improbability in supposing that the railway will extend to the iron works at the actual foot of the mountains. Nynee Tal would then become far easier of access from most of the stations of the North-Western Provinces and Oude than any other Himalayan Sanatarium.

28. It must also be added that the facilities for the construction of a carriage-road from Huldwanee to Nynee Tal are so great that there can be no doubt that this work will be undertaken before long.

29. The position of Nynee Tal has been pronounced by high authority to be an excellent one as a station for European troops, on purely military grounds. On this point I can of course give no opinion, but it is desirable that the fact should be noticed. It has been stated that the position is a good one with reference both to the plains and to the hills ; that it is almost equally accessible from Bareilly and Moradabad, the two most important places in Rohileund ; while at the same time it commands the two principal roads from the plains to Almorah, the capital of the province, at the points where they enter the hills. If it should ever be necessary to send a considerable body of troops to Almora, they must, under ordinary circumstances, take the route either by Huldwanee or Kala Dhoongee.

30. The mountains in the vicinity of Nynee Tal possessing, as I have endeavoured to show; so many important advantages, it remains to be seen how far the other necessary conditions of a good Sanatorium are here capable of being obtained.

31. The printed reports on sanatory establishments give so imperfect a description of Nynee Tal, that some account of this Sanatorium may not be useless. *Other necessary conditions how far obtainable at Nynee Tal.* *Topography of Nynee Tal.* For the following topographical description I am indebted to Mr. Batten.\*

"Nynee Tal occupies a high upland valley or gorge in the Gagur range. South and east of the point where that range attains its highest elevation, at Cheenur peak, 8732 feet above the sea, this peak sends off a spur to the south and south-east, called Deo Pata and Ayar Pata; and the hollow between the spur and the main range of the Gagur, here called Sher-ke-Danda and Luria Kanta, is occupied by the flat portion of the station, by the bazar, and by the lake, which gives its name to the place, and which forms the principal feeder of the Bulleah River, itself an affluent of the Gola or river of the well known Bumowree pass. The settlement may be divided into four portions, *viz.*; first, the valley, second, the south face of Sher-ke-Danda, third, the north face of Ayar Pata, and fourth, the south-eastern termination of the latter hill, called by the separate name of Girwalee. The valley is half land and half water, the lower end being occupied by the lake, and it is only open to the south-east, where the outlet for the water is situated. The length of the whole hollow is two miles, and its average breadth is less than half a mile. The length of the lake is a few yards less than one mile, while its breadth is at one point less than, but generally exceeds, a quarter of a mile. The greatest measured depth of the water is fourteen fathoms, and the average depth is eight fathoms. There is one shallow spot near the centre where the depth is only twenty feet. Fortunately for the permanence of the lake it shallows towards its termination, and is deep at its superior margin. The outlet always exists at from fifty to one hundred feet below the lake, in the natural wall of the cavernous limestone which shuts in the lake at its lower end. In the rains or until the

\* *Note.*—Published originally in Rushton's Almanac for 1850. Some slight alterations have been made to render the account applicable at the present time.

end of November, the outlet is the overflow of the lake, after reaching its seasonal high water mark, usually about 15th July. On the south side the rocky precipices of Ayar Pata descend abruptly into the deep water: on the remaining three sides, the limit of annual shallowing or low water is shewn by a rim of weeds, which however interesting in a botanical point of view are unfortunate as a feature in the scenery. The water is at all times clear and transparent, and in calm weather reflects the surrounding scenery like a mirror. The road round the lake undoubtedly forms the most beautiful promenade in India. The north side of the lake is the present mall. West of the Tal is an open spot, where tents are pitched, cricket played, occasional music bands stationed, and fancy fairs held. Above this esplanade or lawn, as it is called, is the bazar, built in two lines at right angles with each other, and from this to the base of Cheenur the valley is occupied by the majority of houses yet built, most of these having large and often unenclosed compounds with some few attempts at gardens. The church is prettily situated on a high knoll near the upper end of the glen. The valley is beautified by the presence of some of the cypress trees which form so singular a feature in the Nynee Tal landscape, and which cover the southern face of Cheenur. The woods also of oak, maple, ash, hornbeam, birch, alder, poplar, &c., are extraordinarily diverse and lovely."

"The lake is 6409 feet above the level of the sea, and the valley at its western end varies from that elevation to 6800 feet,—the average height of the houses in the glen being about 6600 feet."

"The south face of Sher-ke-Danda is being very gradually appropriated, and the houses situated thereon are perhaps the most eligible in the settlement. None of the objections commonly made to the valley as narrow, confined, gloomy, apply to this hill-side; a large portion of which, together with the crest of the range, (which commands a magnificent view of the snow from Jummotree in Gurhwal to Joomla in Nepaul) is still available for building sites. In some parts plentiful springs of water are found, and in other parts the distance from that essential element is not further than at Landour or Mussoorie. The hill is chiefly of clayslate with occasional greenstone and limestone, and its slope is far from steep. It is covered with a fine forest of oaks, (*Quercus Incana* and *Quercus Dilatata*) with the usual accompaniment of

rhododendron and andromeda, &c. The views from Sher-ke-Danda, of the lake, the glen, the Bulleah hills, and valley, and the far spreading plains, are highly beautiful, even if the lake were blotted out of the landscape. This part of the Gagur range would be admirably situated for a hill station, and would be still most pleasing in its scenery."

"The crest of Sher-ke-Danda varies from 7300 to 7900 feet above the sea. The present houses are situated from 6900 to about 7300 feet. The range as it runs eastward attains to 8200 feet at Luria Kanta."

"Ayar Pata itself is a magnificent feature in the landscape, and its limestone precipices covered with oak and rhododendron are universally admired. But the few houses built upon it {have the disadvantage of a northern aspect, which at a great height in the hills is attended with cold and damp, and at Nynce Tal with a deep clay soil, forming an unfavorable contrast in a sanatory point of view, to the usually dry, shingly, and slaty foundations of the settlement."

"Giwálee is a fine hill overhanging the Bulleah valley and the Nehal River sources, and may be said to commence in a southerly direction, immediately after crossing the Bumowree road and passing the end of the lake. There are six or seven houses scattered about it, and hundreds might be built, all at heights varying from 6000 to 7000 feet."

"The want of spring water is one drawback: (common to the whole Ayar Pata side) and this hill also is the first attacked and the latest abandoned by the host of clouds which rush up to, and form on, the mountains in the rainy season. There are some fine flat park-like spaces in Giwálee, most tempting to a builder's eye. The precipices which abruptly end the scene to the south, and from which one uninterrupted view is gained of the forest, the Bhabur clearings, the Terai, and the plains, in the direction of Moradabad, are celebrated as one of the Lions at Nynce Tal, under the name of the Landships."

"The climate of Nynce Tal may be judged of from the foregoing description, and the locality at all events by those who know what a Himalayan climate is. Hitherto the settlement has been found to be highly salubrious, and whatever defects it may possess, are common to the other Sanatoria; whilst in the shelter, equable temperature, and comparative dryness of its valley, it has some peculiar advantages."

32. Barracks for European soldiers have been erected on the hill called Kaila Khan, about a mile from the southern end of the lake. This part of the station of Nynee Tal possesses in a remarkable and very unusual degree, almost every natural advantage which can be expected to be obtained at a Sanatorium in these mountains. Kaila Khan is a ridge running north and south, forming a spur of the Luria Kanta range. At its junction with the main ridge, it has an elevation of about 6300 feet ; it then almost immediately rises to about 6500 feet, but not steeply or precipitously, and then falls rather rapidly towards the south. It has been stated that there is a deficiency of room for barracks, but it is impossible that such an assertion could be made by any one who has really examined the ground. Between the elevations of 6500 and 5800 feet, there is ample room for the accommodation of several thousand men. A larger number of barracks than are ever likely to be required, could be built without any difficulty at elevations exceeding 6000 feet ; while on the neighbouring slopes of Luria Kanta, sites are available for officers' quarters, hospitals, &c., at almost any height up to 8200 feet. The ground is nearly every where suitable for building purposes, and there is hardly any part of the Nynee Tal station where the slopes are so gentle, and where excellent building sites are so numerous. The best ground has not hitherto been occupied.

The Kaila Khan ridge is well but not densely wooded, and the views which it commands are magnificent : there is very little under-wood, and no rank vegetation : the ridge is composed of argillaceous schist ; the soil is good ; and the surface drainage excellent. I believe with Dr. Wilson, that "a more healthy position could not be chosen." \* The climate of Kaila Khan, so far as temperature is concerned, may be considered the same as that of the greater portion of the Nynee Tal settlement, regarding which I shall speak further on ; but Kaila Khan has the advantage of being an open hill and not a confined valley. Its situation on the southern face of the range gives it a large amount of rain and cloud during the rainy season ; but in this respect there is little practical difference between it and other parts of the station.

This ridge has one advantage in which it almost stands alone : an unlimited supply of excellent water can be made available, and I know of



no other open hill of this elevation in the outer ranges of the Himalaya of which this can be said. The springs on the ridge itself are unimportant, but water can be taken in pipes or channels from the lake in any quantity that may be desired to almost every part of the Kaila Khan Hill. The existing buildings are supplied in this manner at the present time; and if barracks should be erected at Kaila Khan on an extensive scale, the expense of supplying them with water will not be a very serious item in the cost.

No part of the Nynee Tal settlement, and no other mountain of equal height with which I am acquainted, is so accessible from the plains. If the carriage-road from Huldwanee, of which I have before spoken, should be made, it will pass along the whole ridge of Kaila Khan. Even now carts come to within seven miles from the barracks. The construction of the new road would be a most useful undertaking. The cost and difficulty of carriage in the hills are so great, that on economical grounds alone the work would be desirable.

The Kaila Khan Hill has one defect as a station for European troops: there is no level ground sufficiently extensive to form a parade for any considerable number of men. A cricket ground might be made at a distance of about a mile and a half from the barracks. The large water supply affords peculiar facilities for gardening, and ample space for this purpose is available. Level roads and walks either exist already or can be made to almost any extent that may be desired. The vicinity to Nynee Tal gives the men unusual opportunities of healthy out-door amusement: and the advantages can hardly be estimated too highly which the lake affords with its rare facility for bathing, boating, and fishing.

33. The general remarks that have been already made regarding the climate of these mountains are applicable to that of Nynee Tal. From the observations of eleven years from 1846 to 1856, which General Sir W. Richards has been good enough to communicate to me, I infer that the mean temperature of 6800 feet at Nynee Tal is about 56°; that the temperature of May and June, the two hottest months, is about 67°; and that of January, the coldest month, is about 44°. The highest temperature observed in eleven years, was 88° in June 1851; the lowest was 19° in January 1847. The means of the maxima and minima for eleven years are 85 and 27°.

The temperature is very equable. The mean daily range of the thermometer in June is about  $10^{\circ}$ , and in January about  $13^{\circ}$ . For eight or nine months of the year the air is generally extremely dry, while during July, August, and September, it is frequently almost saturated with moisture. The periodical rains commence about the same time as in the plains, that is towards the middle or end of June, and they continue until nearly the close of September. From that time until the latter end of December the climate is generally clear and invigorating. About Christmas there is usually, as in the plains, some rainy and cloudy weather, but it does not last long; and January is generally clear and frosty. This is the coldest month in the year. The end of January and the first fortnight of February are often rainy; and at this elevation heavy falls of snow are not uncommon. Snow does not lie on the ground for any length of time, except in shady and sheltered situations, or on the north slopes of the hills. March is generally clear and cold. From April to June the weather is usually warm and hazy, with frequent thunder storms. At this season hail often falls in large quantities.

\* The average fall of rain is about 100 inches, of which nearly 90 inches fall during the season of the periodical rains. The greatest observed fall was 144 inches in 1853; the least was 48 inches in 1848. From the observations of nine years by Sir W. Richards, it appears that in each year the average number of clear days was 227; of cloudy days without rain 68; and of days with rain, hail, or snow, 70.

The lake never freezes; its temperature at a considerable depth is stated by Dr. Wilson to be  $51^{\circ}$ : the water is very pure and wholesome.

It appears unnecessary that I should enter into further detail regarding the climate of Nynee Tal. The experience of many years has shewn that there is no Sanatorium in these mountains possessing greater advantages in this respect\*. It is above the height at which there is any risk of malarious fever, and it has not hitherto been visited by any serious epidemic disease.

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\* *Note*.—It is necessary to state that the account of Nynee Tal, printed at page 111 of the reports on sanatory establishments, cannot in many important respects be accepted even as approximately correct. Any one who possesses the most rudimentary knowledge of the Himalaya at this elevation, will think it strange to be told that the months of July and August are hot and sultry; that September and part of October are unhealthy; and that during the rainy season every one suffers more or less from headache, and "malaria listlessness." I need not comment upon the advice that the trees should be cut down to half their number, having already given my opinion upon this subject.

34. In the printed reports on Sanataria, the erection of hospitals

Hospitals at Bheem Tal  
and on Cheenur not wanted.

at Bheem Tal and on Cheenur have been recommended. It seems to me that there is nothing to be gained by this. If a hospital in a warmer climate than that of Kaila Khan is wanted for the treatment of particular cases, I see no object in going to Bheem Tal, eleven or twelve miles off, when the same climate, or one with any other amount of heat that may be required, can be obtained at a quarter of the distance. There are many places on the road to Huldwanee within a few miles from Kaila Khan, with a climate certainly equal and probably superior to that of Bheem Tal, and very much more accessible not only from Nynee Tal but from the plains. Kaila Khan and indeed Nynee Tal itself are nearer to the plains than Bheem Tal.

On the other hand, for patients who require a colder climate than that of Kaila Khan, there seems no advantage in erecting a hospital on Cheenur, three or four miles distant. Nearly the same elevation can be obtained on Luria Kanta, immediately above the barracks, while in every other respect the sites upon Luria Kanta are superior to those upon Cheenur: they are more accessible; the ground is more suitable for building; and water is much easier to obtain.

35. The conservancy arrangements at Nynee Tal have hitherto

Conservancy. been extremely bad; but an elaborate scheme

is now being carried out, which ought to remove every cause of complaint. The plans which have been proposed by Dr. Clark, Inspector General of Prisons, appear to me in all respects admirable. They have been adopted by the Municipal Commissioners, and if they be properly executed, they cannot fail to secure the objects that are desired. These plans will be in almost all respects equally applicable to the portion of the settlement that lies within the boundaries of cantonments; and it is very desirable that they should be adopted without delay.

36. In concluding these remarks upon Nynee Tal, I wish to add

Importance of laying out  
Sanatarium according to a  
definite plan.

that if a Sanatarium be established at Kaila Khan, or indeed in any other place that may be chosen, it should be laid out according to a well considered and clearly defined scheme, which should leave as little

as possible to the future fancies of individuals. This should be done although there may be no intention of carrying out the whole scheme at once. A complete system of roads should be constructed, and ground should be marked off for buildings, for gardens, and for other purposes.

There is another matter which ought to be provided against from the outset with the utmost care. If the most positive orders are not laid down, it may safely be predicted that the ignorant prejudice against trees to which I have already alluded, will sooner or later cause irreparable injury to the salubrity of the climate and to the beauty of the scenery. It is lamentable to think of the consequences of these unfortunate notions, backed as they not unfrequently are by the sanction of a *soi disant* medical experience. At the present time there is too little, rather than too much, wood on the greater part of the Kaila Khan Hill, and not a tree ought to be cut without the sanction of persons who are competent to decide upon the necessity. Within the boundaries of the Nynce Tal settlement, the byelaws, according to which the affairs of the municipality are administered, provide sufficiently for the protection of the timber. Rules of a still more stringent nature ought to be laid down for the cantonments.

37. The only other place in the vicinity of Nynce Tal which it seems to me necessary to mention as being at

Sham Khet not a desirable situation for a Sanatorium.

all suitable for European troops, is Sham Khet. This was recommended by a committee which assembled at Nynce Tal in 1858.

Sham Khet is a valley on the southern side of the Gagur, not far from the water-shed of the range, about 7 miles east of Nynce Tal: it lies near the point where the road from Nynce Tal to Bheem Tal meets the road to Almorah, and near the old line of road from the foot of the hills at Bhumowree to Almorah. The height of the valley above the sea is about 5600 feet. There is a considerable extent of level ground, the greater portion of which is now under cultivation. Except at its eastern extremity, the valley is almost surrounded with hills. Although Sham Khet is further from the plains than Kaila Khan and not so easily accessible, its situation is in this respect unobjectionable; and there would probably be little difficulty in constructing a carriage-road to the plains. It has the advantage over Kaila Khan of possessing more level ground

for purposes of parade, amusement, &c.; but with this single exception Sham Khet seems to me to be in every respect greatly inferior to Kaila Khan.

The elevation would be barely sufficient even on an open ridge. Sham Khet being a confined valley, I consider the elevation to be decidedly too low. The heat during a considerable part of the year would be objectionable.

During the rainy season the humidity is probably at least as great as at Kaila Khan. The soil is not so dry and the natural drainage is not so good. The supply of water is scanty during the dry season, and it may be doubted whether means could be adopted for bringing it from a moderate distance in sufficient abundance. Altogether I consider that the disadvantages of the situation far counterbalance the sole advantage which I have been able to discover.

38. The only other places in Kumaon to which I need refer, as Almorah as a Sanatorium. they have been either adopted already or have been recommended as fit sites for Sanatoria, are Almorah and Lohoo Ghat.

Almorah, the capital of the province of Kumaon, is situated in the interior of the hills about 30 miles to the north-east of Nynce Tal. The town and military and civil stations, are built on a ridge about two miles long, of which the average elevation is 5500 feet. There is no forest, and the surrounding hills are generally bare of wood. The climate is healthy. As a place of permanent residence for persons in health, Almorah is one of the most desirable stations in the hills or indeed in India, but for invalids who have suffered from the heat of the plains, and who require an invigorating climate in the hot season, the temperature of Almorah during several months of the year is too high. The almost total absence of shade makes the heat the more objectionable. I have not the means of giving with correctness any meteorological details regarding the climate of Almorah: the temperature in the hotter months exceeds that of Nynce Tal to a much greater extent than would be supposed from the mere difference of elevation.

There is little level ground and there is no good site for barracks. The supply of water although unusually large, considering the situation of the place, is scanty during the dry months.

39. For these and other reasons, among which the distance from the plains is one of the most important, there can be no doubt that Almorah is in no way suited to become a station for any considerable number of European troops.

Almorah not suitable as a station for European troops.

It is not improbable, however, that it would be a good plan to establish a hospital there for the treatment of cases to which the climate of Nynee Tal is not suited. During the rainy season in particular, Almorah possesses great advantages: the average annual fall of rain at Almorah is less than half that at Nynee Tal, and Almorah is remarkably free from cloud and mist.

40. Lohoo Ghat has been sometimes strongly recommended as a station for European troops. It is situated in a valley on the north side of the Kanadeo range, which is in fact a continuation of the Gagur, at a distance of about 28 miles from the foot of the hills at Burmdeo. It lies about 10 miles to the west of the Kalee or Sardah River, which separates the British territory from the Nepaulese province of Dotce. "The station" says Major Madden, "occupies a pleasant tract of grassy undulating ground, sprinkled with Deodars, and the very neat and English looking houses and grounds of the European residents. It is calculated to be 5649 feet above Calcutta. The granite of Chumpawut here disappears, and gives place to blue clay slate in vertical strata with some quartz. The ground rises gently towards the north, and at about three miles distant is backed by the grassy saddle-back mountain called Sooce in maps, but by the Natives Jhoom. The height of the summit of Jhoom is 7100 feet above the sea. The peak of Kanadeo rises to 7240 feet. The pass below Kanadeo on the road to Burmdeo has an elevation of 6450 feet."

Lohoo Ghat as a Sanatorium.

41. Lohoo Ghat and its vicinity undoubtedly possess many advantages: the ground is unusually level; there is ample space for parades and for all purposes of exercise and amusement; the scenery is pleasant; and the climate is healthy. The grassy slopes of Lohoo Ghat offer so agreeable a contrast to the generally steep and rugged mountains which cover the province, that it is difficult not to be somewhat prejudicial in its favor; but I cannot consider the site a really

Advantages and disadvantages of Lohoo Ghat.

eligible one for European Troops. As a Sanatorium for invalids the elevation is undoubtedly too little, and the temperature too high, and the same objections hold good against Lohoo Ghat as a permanent station for European troops. The remarks that have been made regarding the climate of Almorah and Sham Khet, apply almost equally to that of Lohoo Ghat. In the summer months the heat in a valley only 5600 feet above the sea, is necessarily objectionably great. The fall of rain is considerable, but much less than at Nynce Tal. From the observations of five years it appears that when the annual rain-fall at Nynce Tal was 86 inches, it was 51 inches at Lohoo Ghat and 34 inches at Almorah. These figures are, however, I imagine, below the real annual mean in each case. Although I think the elevation of Lohoo Ghat decidedly too little, yet considering the advantages of the situation, the climate might perhaps be nevertheless looked upon as sufficiently good, if there were no other objections.

42. The objections, however, appear to me to be very serious.

Inaccessibility of Lohoo Ghat from the plains a fatal objection.

Regarding the minor disadvantages of Lohoo Ghat I need not say much. They are such as may be usually anticipated in these mountains at similar elevations. Although the numerous

Deodar trees are a pleasant feature in the scenery, there is a deficiency of wood and of shade. The objection of which I have spoken in para. 15 of this letter, to stationing European troops at a distance from existing stations, in solitary mountains, where there is scarcely any population, applies in full force to Lohoo Ghat. The chief objection, however, to Lohoo Ghat as a station for European troops, is its inaccessibility from the plains.

In paras. 24 and 25 of this letter I have shewn that the climate of the Terai and Bhabur below Burmdeo is pestilential in the extreme; while with regard to the distance from Barcilly and Pilibheet to the foot of the hills, Burmdeo has no advantage over Huldwanee. It is only during the four or five coldest months of the year that it would be safe to march troops along this line. In the war with Nepaul in 1815, when we first entered Kumaoon, a force was sent into the hills in June and July by this route. The troops, encamped near Chumpawut, were not far from Lohoo Ghat, and soon after their arrival they were attacked with Terai fever in its worst form, and the mortality among the men was very great.

In para. 23 of this letter I have shewn that the difficulties in approaching Lohoo Ghat do not end at the foot of the hills. On account of the configuration of the mountains and the extreme unhealthiness of the valley of the Luddheea, the difficulty of marching from Burmdeo to Lohoo Ghat is a very serious one. The present road is infamous, and there is no bridge across the Luddheea,—a river that is often unfordable for many days together. The physical difficulties can, to some extent at least, be got over by the expenditure of money, and the construction of an entirely new road ; but the difficulty caused by the unhealthiness of the climate appears to be insuperable.

No precautions that can be taken, can ever make the approach to Lohoo Ghat from the plains safe at all seasons for European soldiers. A military station at Lohoo Ghat would be in a great measure cut off from direct communication with the plains for the greater part of every year, whatever emergency might happen. The difficulty of moving stores during the unhealthy season would also be extremely great.

I need not enlarge further on the obvious military and economical objections which would thus result.

43. Altogether it seems to me that Lohoo Ghat, when it is actually reached, certainly offers no advantages sufficiently great to counterbalance the serious objections which have been pointed out. It possesses, in my opinion, only one advantage over Kaila Khan,—the large extent of comparatively level ground. In all other respects Lohoo Ghat seems to me very inferior, and it fulfils most imperfectly the conditions of a good Sanatorium, which I have endeavoured to lay down in the first part of this letter. Notwithstanding its superiority in some respects, I consider Lohoo Ghat to be upon the whole decidedly inferior to Sham Khet as a station for European troops.

Lohoo Ghat not a desirable station for European troops.

44. I have not entered upon the question of the manner in which occupation can best be provided for European soldiers at military stations in the hills.

Occupation for European soldiers.

The admirable orders regarding the establishment of work-shops, which have lately been issued by His Excellency Sir Hugh Rose, have been the most important step ever taken for the purpose of removing what has long been one of the opprobria



of the British Army, and we may reasonably hope that these enlightened measures will lead to most valuable results. The matter is one which is of even greater interest in the plains than in the hills. It has no special bearing on the subject of the present letter, nor is it a question which I feel myself competent to treat.

45. In concluding this letter I wish to acknowledge the great assistance which I have received from Mr. J. H. Batten, civil servant, and Major Ramsay, commissioner of Kumaoon. These gentlemen who possess a more intimate knowledge of Kumaoon and Gurhwal than any other persons now living, have authorized me to say that the facts which have now been stated, appear to them to be correct, and that they share the opinions which I have now given. This letter may, therefore, be considered to express not only my own views but those of Mr. Batten and Major Ramsay also.

From Major W. C. ERSKINE, C. B., Commissioner of the Jubbulpoor Division, to Sir G. COUPER, Bart., C. B., Secretary to the Government of the North-Western Provinces,—(No. 69, dated Jubbulpoor, the 5th April 1861.)

I HAD the honor yesterday to receive your letter No. 499A, dated the 28th of March, calling on me for any information I may be able to give regarding places fitted for Sanatoria in these territories or in their neighbourhood.

2. I have long been collecting information of this description, and I have the honor now to enclose the documents which I believe contain all the information that has been collected on the subject.

3. The whole of these refer to either Puchmurree or to Muthoor, both situate on the same range of hills in Nagpore, running on the south of the valley of the Nerbudda from Soonee to Baitool through Chindwara.

4. Muthoor has the advantage of having more space for a Sanatorium than Puchmurree; but one objection to it is, that thousands of pilgrims annually pass through the place which is holy in the eyes of the Hindoo, and they almost invariably bring cholera with them; and last year hundreds died of it. Some of the Nagpore authorities proposed that the pilgrimage might be stopped, but I do not suppose the Government would agree to this.

5. Puchmurree again has beautiful sites, not large I believe, but still large enough for many detached estates or for barracks. The scenery is described as very beautiful, and the air clear and fine; though not very cold still officers have passed the hottest months there in small tents and never felt the heat too great. An easy ascent could be made from the Nerbudda valley from Futtchpoor in the Hoshungabad district; and when the rail from Bombay to Jubbulpoor is completed, the branch line which is to run to the coal fields will come within 8 or 10 miles of Futtchpoor.

6. From what I have lately heard of Puchmurree, I am inclined to think better of it as a site for a Sanatorium than I did in 1856; and several medical men here think it will be high enough and well suited.

7. The height of the highest peak is about 5000 feet above the sea, but the best building sites are from 3500 to 4000 feet above the sea.

8. Captain Pearson's memorandum is very long and contains perhaps more about wood than other things; but there is much interesting matter in it.

9. I have for some time been in correspondence with the military authorities here and at Saugor about sites for Sanatoria, and I believe that extracts of the greater part of the information I have collected, has been sent to His Excellency the Commander-in-Chief.

10. If Puchmurree be selected for a trial, a few troops should be sent there from Saugor and from Jubbulpoor.

11. Ummur Kuntuk has certainly passed from our possession, but it is only the source of the Nerbudda that has, and this ought not to stand in the way of our making it a Sanatorium, if it is considered a better site than Puchmurree. It certainly would not be so convenient; as to get at it, troops would have to carry their provisions.

From Major W. C. ERSKINE, C. B., Commissioner of the Jubbulpoor Division, to C. B. THORNHILL, Esq., Officiating Secretary to the Government of the North-Western Provinces, Agra,—(No. 157, dated Jubbulpoor, the 25th June 1856.)

I HAVE the honor to enclose three interesting reports on the Puchmurree Hills which divide Nagpoor from Baitool, Hoshungabad, and Nursingpoor.

2. The first is by Major Snow, Deputy Commissioner of Chindwara in Nagpoor, in which zillah the hills are situated; and I am indebted to Mr. George Plowden, Commissioner of Nagpoor for a copy. The second I was induced to ask Mr. J. E. Medlicott, Assistant Geological Surveyor for; and the third was written at my request by Dr. Jerdon, Surgeon of the Madras 4th Cavalry, one of the, if not the most, scientific officers in this part of India.

3. Mr. Plowden addressed me with a view of my assisting him in making roads up to the plateau in the central portion of the hills,—a beautiful spot,—and which he thought might be suited as a Sanatorium for the Nerbudda and Nagpoor provinces; but after reading the three reports, I have come to the conclusion that although “Puchmuree” might be a very pleasant residence it is not suited for a Sanatorium.

4. The highest peak rises nearly to 5000 feet above the sea, but only 2300 above the valley of the Nerbudda; and the table land of Puchmuree is about 700 or 800 feet lower than the Mahadeo peak.

From C. B. THORNHILL, Esq., Officiating Secretary to the Government of the North-Western Provinces, Agra, to Major W. C. ERSKINE, C. B., Commissioner, Saugor and Nerbudda Territories,—(No. 962 A, dated Head Quarters, Nynee Tal, the 14th July 1861.)

I AM directed to acknowledge the receipt of your letter No 157, dated the 26th ultimo, submitting reports by Major Snow, Deputy Commissioner of Chindwara,—Mr. J. E. Medlicott, Assistant Geological Surveyor,—and Dr. Jerdon, Surgeon, Madras, 4th Cavalry, on the eligibility of the Puchmuree Hills, which divide Nagpoor from Baitool, Hoshungabad, and Nursingpoor, for a Sanatorium.

2. In reply I have the honor to state that the Lieutenant Governor believes the opinion which you have formed on this subject to be the sound and correct one.

3. If, in communication with the Commissioner of Nagpoor, you should desire it, the Lieutenant Governor will have pleasure in directing the publication of these interesting papers in an early number of the selections of this Government.

From J. E. MEDLICOTT, Esq., Assistant Geological Surveyor, to Major W. C. ERSKINE, C. B., Commissioner, Jubbulpoor Division,—(dated the 2nd June 1861.)

You requested me to furnish you with any information I may have obtained on the subject of the climate, scenery, and roads of the Mahadeo or Puchmurree Hills; and it seems to me that I shall be most likely to succeed in meeting your wishes, if you will permit me to offer some remarks in the form of appendix to the excellent report by Major Snow, which you were good enough to send for my perusal, and to the contents of which, I shall, I fear, have little of any value to add.

Major Snow states that the table land on which the village of Puchmurree stands, is approached on the south by the Tara pass, on the west by the Rori pass, and on the north by the Pugara pass; the two former being very steep and rugged, the latter a gentle slope. To commence with this last,—if a traveller coming along the Trunk Road of the Nerbudda valley, east from Hoshungabad or west from Nursingpoor, turns off to the south, at a place called Bankeri about half way between the two stations, he will find a large village called Futtehpoor at the foot of the outer range of those hills which bound the great valley on the south all along its course.

A pass in this outer range (at the mouth of which pass Futtehpoor stands) leads into the valley of the Deimoa or Deo River, just here parallel to that of the Nerbudda. Crossing this valley in a south-west direction, a road leads to a village called Mutkoolie which is about 15 miles from Futtehpoor, and near which is the foot of the Pugara pass mentioned above.

Along this route, *viz.* from Bankeri through Futtehpoor to Mutkoolie, a line of carriage-road might be traced, connecting the foot of the Pugara Ghat with the Hoshungabad and Nursingpoor road, and not exceeding (as nearly as I can state distances without having measured them) 20 miles in length, and with easy gradients throughout. The path up the Pugara Ghat itself, though steep in places, and in other respects as bad as it can well be, yet follows a line without greatly diverging, from which a carriage-road may be laid out, and good slopes obtained, without, as I conceive, having to encounter difficulties greater than would be met in a similar undertaking in any *ordinarily* hilly and jungly country, and thus Puchmurree might be readily connected by a practicable carriage road, with the principal highway of the Nerbudda valley.

Major Snow states that Pisooa, a village near Mutkoolie and the foot of the Pugara Ghat, is 40 miles from Hoshungabad and 60 from Nursingpoor; and I presume his estimate of the distance is correct. Compared with this you might see that the line above suggested, through Futtehpoor, makes a considerable *detour*, specially if Hoshungabad is the place to be reached; but as it would be necessary to construct 100 miles of road, in order to bring the 2 stations within the above-mentioned distance of Pisooa, *viz.* 40 and 60 miles respectively, it may probably be considered that the cross road through Futtehpoor is likely to meet all the requirements of the case for the present at least.

The Rori Ghat may I think be altogether omitted in estimating the facilities of approach to Puchmurree; for although its position on the west of the plateau seems to make it as the natural way towards Hoshungabad and Baitool, yet the very impracticable nature of the country below towards the west, renders it improbable that any line of communication will ever be carried over the hills in that direction.

Not so with the third, the Tara Ghat: it on the contrary is likely to become a very important road, in the event of a Sanatarium being established at Puchmurree; for, as Major Snow remarks, the traveller from Nagpoor or Baitool must, in order to get to the north side of the hills, *viz.* to the Pugara pass, make a very long *detour*, and by execrably bad roads. With regard to the difficulties of the pass itself, although it would doubtless be costly and troublesome to make a carriage-road up this side of the hill, I believe that the present path may be so far improved as to become a tolerably good bridle-road.

Major Snow gives two routes from the foot of this Ghat to the south.

1st.—By Doosawance Pugara (Pertabgurh) to Chindwara, or to Powrair.

2nd.—By Jouth Muthoor Jamye to Oomrait: and he mentions a third by the Goruk pass. This latter route would run thus:—by Jouth (up the Goruck pass to) Rangle Hurrioghur to Oomrait, or by Jouth Kanglo Jamye to Oomrait; and it presents this advantage over the other two, namely that it crosses in a depression of the Doosawance and Muthoor range, the highest point passed over being about 400 feet lower than either of those villages. Even now this path is nowhere very steep. Easily practicable inclines might readily be obtained,

and those difficulties of construction which Major Snow justly represents as so serious on the Doosawancee and on the Muthoor lines of road, altogether avoided. Oomrait is I believe accessible from Nagpoor, Chindwara, and Baitool, and it may be connected with the foot of the Tara pass by the line just described. Travellers from this side must, however, for some time at least, be contented to climb to the new Sanatarium by a road similar to those which are still the only approaches to several of the hill stations of the Himalaya.

Reached there by either of these lines of road from the north or from the south, the plateau presents a most agreeable aspect, which Major Snow rightly compares to that of an English park.

Its gentle undulations are covered with green sward, prettily varied by scattered clumps of trees, and watered by clear running streams. Three principal peaks rise to a height of about 700 feet above the table land; two on the south called Choonjhur and Mahadeo, respectively, and one on the west called Doghur. Their rugged outline and grey looks form a striking and most picturesque feature in the landscape, and add greatly to its many beauties of this park-like ground. There are about 10 to 12 square miles; nor is this the whole of the area available for building on, for several spurs or half detached hills projecting like promontories from the main mass, offer some most picturesque sites for a bungalow: and towards the north side also, where the massing is intersected by ravines, and begins to slope down towards the valley of the Deivra, the limit of good building ground may be still further extended.

There is much in the position and much in the scenery of Puchmuree to make it, as a residence for the hot months, most inviting to Europeans living in Nagpoor and the Nurbudda stations; but considered as a Sanatarium, some other elements must be taken into the estimate of the advantages which it may offer, and first of all climate.

Having remained on the hill only three days, I must beg to deprecate the idea of being supposed to speak *ex cathedra*, or even to offer my remarks on the subject, as really trustworthy evidence. This premised, it seems to me, when I look at the question *a priori*, that the actual elevation above the sea (a little under 4000 feet) is insufficient of itself to warrant the conclusion that the climate will necessarily be such as to offer very great sanatory advantages.

There are no doubt conditions under which 4000 feet of elevation causes a very well marked change of climate. A hill rising at once to that height from a plain, not itself greatly above the sea level, may have a climate offering such advantages: probably also the proximity of great mountain masses exert a powerful influence on the climate of lower ground in their neighbourhood. At Puchmurree no such conditions are realized; the little plateau lies high in the culminating mass of a long and comparatively low range, none of whose highest peaks attain 5000 feet of elevation. 2000 feet may I think fairly be taken (as Major Snow states) for the difference between the general average elevation of the country from which it rises, and that of the little table land itself; but there are very considerable masses of high ground not far off, which rise to within a few hundred feet of the Puchmurree level, and consequently above that general average. These conditions I believe to be unfavorable to the probability of the climate of Puchmurree being found to offer such marked contrast to that of the plain below as will confer on the place any real advantages as a Sanatorium.

I venture to offer these suggestions because their effect on my mind has been a conviction that the climate of Puchmurree will be found on the contrary to resemble closely that of Saugor or Jubbulpoor, with probably a few degrees more cold in the cold weather, and colder mornings throughout the year; a few inches more rain during the monsoon, and perhaps a few more showers during the dry months; differences which though very pleasant, I believe not to be sufficiently strongly marked to exert a very powerful or very rapid effect on an exhausted and impaired European constitution. To refute this opinion or to confirm it, there must be placed in the hands of an experienced physician, a meteorological register carefully kept on the spot for a year. Nothing short of this will I believe furnish solid data for a sound judgment on the climate of the place.

In conclusion then, it is my belief that Puchmurree can be easily approached, or that its approach may be easily improved so as to render it readily accessible both from the north and the south; that the position of the plateau among the hills, its scenery, and that of the surrounding valleys, render the place most desirable as a residence; but that I hesitate to conclude or rather hold it rash to assume that its climate fits it to a Sanatorium.

From Major R. T. SNOW, Deputy Commissioner, to G. A. C. PLOWDEN, Esq., Commissioner of Nagpore,—(No. 30, dated Chindwara, the 23rd April 1856.)

I HAVE the honor to acknowledge the receipt of the letter, requesting a report on my late journey to the Mahadeo Hills, and on the fair held in their neighbourhood.

2. The Mahadeo Hills are situated as the crow flies, about 45 miles north-east of Chindwara, but the shortest route must make the travelling distance about ten or twelve miles more.

3. They consist of a clump of hills rising almost perpendicularly out of a plain, which must be on about the same level as the town of Chindwara, but from which latter they are separated by a lofty range of hills running east and west, very nearly as high as the table lands of the Mahadeo clump, on which the small jagheer of Puchmurree is situated. This table land is of very difficult natural access on all sides. The ascent from the south-east, or the point nearest to Chindwara, is by a pass known as the Tara Ghat, which does not admit of the passage of beasts of burthen: led horses can surmount it, but in some places it is extremely difficult and hazardous for them. I ascended and descended by this route myself on foot, and do not think it will be possible to make it available for laden cattle. On surmounting what appears from the plain below to be the general summit of the range, the track or path runs for about a mile almost on a level, till it reaches a high peak called *par excellence* the Mahadeo Peak, when it slightly descends for a short distance into a small area or basin, at the extremity of which is situated the "cave of Mahadeo", which extends for a considerable distance underneath the peak of the same name, and from which flows a small stream of water, which running through the centre of the basin descends into the plain below, whence it circles round the base of the clump to the eastward and northward under the name of the river "Dynwa." From this spot the path again rises, but is of easier ascent than the first portion of the ghat; and after about half a mile of level on its summit, again descends by a steep path known as the Kowreel Ghat, on to the plain on which the village of Puchmurree stands, at a distance of about 5 miles beyond the Mahadeo cave, and on about the same level. The plain around the village, as far as the eye can reach, is totally different from the usual scenery of this country, having more the appearance of a large English park, consisting of level grass plains interspersed with



large trees and clumps of wood. It is by no means extensive, probably not exceeding 4 miles in breadth in any direction. I made no stay there myself, but I have learned from others who have visited the spot, that it retains its green and fresh appearance throughout the year, a fortnight seldom passing without a shower or two of rain. I took no thermometer up with me, so am unable to do more than guess at the temperature by comparison with what it was below. The time was early in the month of March, and the thermometer in the valley beneath the hills (some 2000 feet lower than Puchmuree) ranged at day-light in the open air from 42 to 54° (only reaching the highest point one morning when the air was loaded with heavy thunder clouds,) and ranging in a tent in the open plain at the hottest period of the day from 90 to 93°. The heat at Puchmuree would probably be at the same time some 5 or 6 degrees less at day-light, and possibly from 8 to 10 at mid-day.

4. I have no doubt whatever that the climate of this favored spot is admirably calculated to fit it for a Sanatorium and place of resort in the hot season for persons living in other parts of the Nagpore territories, or in the valley of the Nurbudda: to the stations in which latter region it is much more accessible than from Nagpore, as I shall presently show.

5. The other ghats or passes leading to Puchmuree, are the Koree Ghat, on the south-west face, and the Pugara Ghat on the northern: the former is said to be practicable for laden cattle, and is accessible from Hoshungabad and Baitool, but the latter is by far the easiest, and from all accounts the only one by which beasts *heavily* laden could ascend.

6. My route from Chindwara to the foot of the Tara Ghat was as follows:—

1st. Jummooneeah, about 11 miles through a level country,—covered nearly throughout with jungle, except in the immediate neighbourhood of such villages as are situated on the road. The road is crossed by the Kolbira river and several minor streams, but in other respects presents no obstacles to the formation of a pukka road.

2nd. Oomrait, about 7 miles:—the remarks on the former stage apply to this.

3rd. Boodwara, about 8 miles:—the rout is through jungle the whole way; there are several rises and falls in the ground, but no obstacles of consequence to the formation of a good road. In the hills

to the northward of this stage from Moyaree to close to Boodwara, coal is found. At Moyaree there is a hollow under the hill, where it is said to be frequently found on fire.

4 $\frac{1}{2}$ l. Foot of a range of hills about 1 $\frac{1}{2}$  miles—north of Jamye about 7 miles. There are one or two small ghats on this stage, but nothing of any difficulty. The road is through jungle all the way, except immediately about Jamye, and very stony.

5 $\frac{1}{2}$ l. Muthoor about 8 miles. There is a long, steep, and difficult rocky ghat at the very commencement of this stage, with one or two other considerable ascents and descents leading eventually to the top of a range of hills running east and west, on which Muthoor is situated. The road though very bad is practicable for camels and other beasts of burthen; but no wheeled conveyance can come further than the halting place at the foot. The road is stony and through jungle nearly the whole way: about Muthoor the country is more open, with numerous small hills partially clothed with jungle and large ravines, in one of which the "Pench" takes its rise. This land is very high and must be nearly on the same level as Puehmurree. Muthoor was once a flourishing village, but the proprietor a relative of one of the numerous jagheerdars in this region, was a few years since imprisoned at Nagpore for two years, in consequence of a murder occurring on his estate, the perpetrators of which he either could or would not produce. The estate was left to take care of itself; and there are now only 3 or 4 miserable huts where there was once a respectable village. About  $\frac{1}{2}$  a mile beyond it, is the northern face of the range on which it is situated, and from the edge of which the Mahadeo clump is seen, rising apparently like a gigantic wall out of the valley—here about 7 miles wide—which lies between.

6 $\frac{1}{2}$ l. From this I descended by the Muthoor Ghat to a small open patch in the jungle about half way to the foot of the Tara Ghat, some 6 miles, known by the name of Urjoon Khoond, close to a natural reservoir of water formed in the sandstone bed of a nullah, by the action of the stream in the rainy season, and not far from a small village called Joukh, situated on the lower slopes of the Muthoor range—a short march, but from the difficulty of the descent in many places, quite long enough for laden cattle. The whole of the valley here is covered with tiers of smaller hills, the paths over which are difficult in many places, but insignificant in comparison with those over the neighbouring ranges.

7th. The next stage is about 7 miles to the spot on which those attending the mela, which is held annually on the occurrence of the Sheboratree festival, assemble. It is a clearing in the jungle bordered by the Dynwa, a stream of beautiful clear water, which, as mentioned above, takes its rise in the Mahadeo cave. It is distant from the foot of the Tara Ghat about 3 miles, and is known by the name of "Bhowun." I have mentioned above the range of hills lying between Jamye and this valley, —a plain. To reach the Mahadeo from the Nagpore side, this range *must* be passed at one point or another. On its northern face there are three ghats which lead into the valley, separating it from the Mahadeo: the "Muthoor" by which I descended, the "Goruck Ghat" a few miles further to the westward, and the "Doosawancee" some 14 or 15 miles to the eastward of the first-named pass. The two former lead to the Tara Ghat, the latter to a road running through the valley in a northerly direction to the eastward of the Mahadeo clump, turning at Mowaljeer to the westward, and leading thence *via* Pisooa, Raikhera, and Pugara by the ghat of that name to Puchmurree. This road is practicable throughout for beasts of burden, and its only objection is its being so circuitous. From the Pugara Ghat there are direct and practicable roads to both Hoshungabad and Nursingpoor; the former place being distant as the crow flies, about 40, and the latter 60 miles. On returning from the mela I re-ascended the intermediate range mentioned above, by the Doosawancee Ghat, a pass of considerable length and difficulty, but not so difficult as that of Muthoor.

7. From Doosawancee, which is situated about a mile from the summit of the ghat bearing its name, I marched in a south-easterly direction through the hills, with here and there a slight (comparatively) ascent or descent, and frequently along the course of what in the rains is a mountain torrent to Pugara, the principal village of the jagheerdaree of Pertabgurh, a stage of about 13 or 14 miles. From Pugara\* the descent to Chindwara is hardly perceptible, and the main body of the range by this route is left to the northward, the path running gradually rather through than over the southern slopes of the range, without meeting with any abrupt or difficult ghats. From Pugara the route passes to Dalla on the southern

\* Note. A different Pugara from the one before mentioned.

bank of the Pench river, from whence Chindwara is distant about 18 miles.

8. There is another route from Doosawance to Chindwara by a ghat known as that of Eklaira, leading in the direction of Oomrait, but it is stated to be more difficult than that leading from Jamye to Muthoor.

9. The direct road from Nagpore to these hills, after surmounting the ghat leading from the lowlands of Mohgaon to the Chindwara plateau, also called the Tara Ghat, would pass thence by Mohkair to Oomrait, and thence onwards, as I have described, to the foot of the Tara Ghat in the Mahadeo range; or if it should be found impracticable to render this ascent available for general purposes, as far as Muthoor on the route described above, and thence descending by the Doosawance Ghat northward, through the valley to the eastward of the Mahadeo clump, by Delakaree, Sectadongree, Bajeepanee, and Mowaljeer, where turning to the west, the road as before described, ascends from Pisooa through Pugara to the Puchmurree plain. By this circuitous route, 60 odd miles would be added to the journey, making it from Chindwara near 120 miles.

10. The other route from Chindwara to Doosawance *vid* Dalla and Pugara, (Pertabgurh) would be about about 46 miles, and thence by Pisooa and the Pagura Ghat, about 60 miles more by the latter route; therefore the distance of Puchmurree from Chindwara would be nearly doubled. Pisooa at the foot of this ghat is only distant from Nursingpore about 60 miles, and from Hoshungabad about 40. It is by this route however, I fear, that all heavy baggage will have to proceed, unless the difficulties of the Tara Ghat can be more easily surmounted than I anticipate.

11. From the top of the ghat between Nagpore and Chindwara to Oomrait *vid* Mohkair, is from 28 to 30 miles, making the distance to the foot of the Tara Ghat of the Mahadeo Hills from thence about 68 miles. By going round by Chindwara this distance would be increased about 8 miles.

12. There is abundance of material for road-making along the whole route, which would reduce the ordinary cost of such a work considerably; but then again the water courses crossing the route, and the

ghats are numerous, and I do not think less than 3000 Rupees per mile could be calculated on as the probable cost of the entire line.

13. The period within which such a work could be executed would of course depend much upon the energy of the officer in charge and the amount of supervision at his disposal; but from my knowledge of the usual delays that attend works of this nature in this country, I should not expect to see it completed under three years.

14. The fair or mela of Dhowlagir Purbut, held at the foot of the Tara Ghat in the valley at the base of the Mahadeo range, is an annual assemblage of Hindoos who come from all parts at the period of the Sheboratree festival to make their offerings to Mahadeo, and bathe at the source of the stream which flows through the cave of that name. Those coming from the Nagpore country, or Berar, or from Nursingpore, Jubbulpore, and the north east, generally assemble at the spot formerly indicated and known by the name of Bhowun. The fair is attended also by traders of all descriptions from Jubbulpore, Nursingpore, Hoshungabad, Nagpore, Bhundara, Chandah, Chindwara; and who erect their canvas stalls on either side of the pathway leading through the open space, the remainder of which is filled by the temporary grass huts of the pilgrims, which are prepared and sold by speculators who come to the spot several days before for this purpose, and usually reap a handsome reward for their labor.

15. There is also a large gathering of pilgrims as well as traders in the area in which the cave is situated, composed principally of persons coming from the north and west, who reach it by the Pugara and Rorce Ghats. The number collected on the two spots at one time this year, could not have been less than 14 or 15,000 souls, who began assembling on the 1st of March and finally broke up on the 8th. In spite of their numbers they were very orderly, and not a single case of theft took place during the whole period of their stay, nor, as far as I have heard, during their progress to and fro.

16. The object, as has been stated, of the assemblage, is to pay their devotions at the cave of Mahadeo, where offerings are made to the supposed deity according to the means of the several parties. These offerings though made in the name of, and to propitiate Mahadeo, are taken in alternate years by the Thakoors or Jagheerders of Puchmurree

Raikhera, and Pugara, who are the hereditary Bhopas or Chief Priests of this temple. It is difficult to account for the blind infatuation which leads the pilgrim to this shrine, year after year, to make his offering, propitiatory of the presiding deity, knowing that it is appropriated by these Thakoors to their own individual benefit. In this indeed there is no subterfuge. This year the collection of these offerings fell to the Thakoor of Puchmuree, who day and night during the 6 days through which the offerings were continued, remained himself seated on a rock at the upper extremity of the cave, personally collecting the amounts offered up in cash, while his mother on a neighbouring seat collected those made in kind. Their seats are surrounded by water, through which, about three feet deep, the pilgrims have to advance, and in which after making their offerings they dip themselves and wash away whatever sins they may have been previously burdened with. In future years the number of pilgrims will probably be considerably increased, as the tax heretofore levied on them prevented many from coming. This year the intelligence of the tax having been discontinued was scarcely promulgated early enough to reach all parts of the country; but the actual fact of its discontinuance will now be spread far and wide by those who attended on this occasion.

17. I must apologize for the length of this letter, which I hope will convey the information sought for, though I fear it is a production of rather a rambling nature.

From T. C. JERDON, Surgeon, 4th Madras Light Cavalry, to Major W. C. ERSKINE, Commissioner, Saugor and Nerbudda Territories,---(dated Saugor, the 19th June 1856.)

IN reply to your letter of the 4th instant, I have the pleasure to tell you that I visited the Puchmuree Hills in 1852, and in accordance with your request give you a few brief remarks on them.

The Mahadeo or Puchmuree range of hills averages on the table land somewhat more than 4000 feet above the sea, from observations by a very good and tried Aneroid barometer, and rises nearly 2300 feet from the level of the Deo Gunga or Deo Nullah, that skirts its southern face. The central portion of the hills is a level plateau with clumps of trees and single trees very prettily interspersed throughout. A few small eminences and hills, usually partly wooded, occur throughout, especially

towards the edges of the plateau, and there are 3 or 4 lofty peaks that tower 700 or 800 feet above the level of plateau. Some small streams of running water intersect the table land; and from the structure of the country I have no doubt that water would be found at no great depth every where throughout the range. The village of Puchmurree is situated about 4 miles from the southern edge of the range, and the plain (I was informed) extended nearly as much more towards the north. The width of the plateau however, is only on an average, 2 to 3 miles.

The whole range is formed of sandstone of every degree of hardness, which would be an abundant and cheap building material; and there is abundance of various kinds of timber trees, among which the Sal tree is conspicuous, at the foot of the range. I found a small seam of coal of no value, however, in the bed of the nullah, where the road crosses from Muthoor; and the shales in contact with it, abounded with the fossil remains of vegetables.

I was on the hills about the middle of April, and found the climate for this season very delightful. The thermometer in a small Bechoba tent under the shade of a tree, not exceeding 80° during the day, whilst at Bhowun at the foot of the hills, it was nearly 100.

My route from Kamptee to Puchmurree lay through Chindwara, Oomrait, Jamye, and Muthoor, as fully detailed by Major Snow. I found the Muthoor range to be about 3400 feet high. Unlike the Puchmurree range, its geological formation is entirely trap, which however appears to overlie the sandstone; for in one or two of the lowest level nullahs I found sandstone. The difficulties of this route over the Muthoor range can however be almost entirely obviated by the route mentioned in Mr. Medlicott's report, *viz.* by the Goruck pass.

By this route I returned to Oomrait from Bhowun in 3 stages, *viz.*, Bore nullah, Hurdaghur, and Oomrait, and found the road over the range of hills, most gradual and easy, both on the ascent and descent; and it only increases the distance by about 6 or 7 miles.

I have no doubt myself that the Puchmurree range would form an excellent Sanatorium during the cold and hot seasons, as well to the residents in these territories as to those at Nagpore. I would not venture to say the same of it for the rainy months, as I fear its height is hardly sufficient to exempt it from fever, at least judging from the height required in

*Southern* India, where 5000 feet is considered as the lowest safe range. By a Sanatorium however, I do not mean to imply that it will prove a substitute for the hill ranges of the Neelgherries or the Himalayas, (a prolonged trip to either of which has in many instances saved the Indian valitudinarian a journey to Europe,) but I mean that to the person in delicate health, to convalescents after any acute attack, and to those who without any specific complaint are suffering from impaired nervous energy, —the effect of protracted residence in a tropical climate, it will prove highly advantageous, were it only to save them from the exhausting and accumulating effect of every additional hot season, which even at Saugor is so trying to a delicate constitution.

I omitted to state whilst on the subject of routes, that the Tara Ghat by which I ascended, is at present with difficulty and indeed with danger traversed by a led horse ; but I am of opinion that an inconsiderable expense would make it available for cattle : in this point agreeing with Mr. Medlicot in opposition to Major Snow's views.

From Colonel A. H. E. BOILEAU, Chief Engineer, Nagpore, to G. PLOWDEN, Esq.,  
Commissioner of Nagpore,—(No. 2568, dated Nagpore, the 23rd December 1858.)

I HAVE the honor of reporting for your information, that in accordance with the permission granted in your letter No. 390, dated the 1st October 1858, I proceeded to visit the hills at Muthoor, 36 miles north-west of Chindwara, with a view of ascertaining their eligibility for the proposed Sanatorium for the European troops about to be quartered in and near this province ; and I have great pleasure in informing you that although disabled for some days by ophthalmia, brought on by constant exposure to the glare for ten hours daily, and afterwards by jungul fever caught during the above trip, by which the preparation of my report has been much retarded, I have obtained sufficient data for proving the great desirableness of establishing a Sanatorium at or near the above locality.

2. After taking hourly observations on the 2nd October last, with six thermometers and three barometers in the chief Engineer's office at Seetabuldee, which is supposed to be 939 feet above the level of the sea, I quitted this station on the 5th, and made another hourly series of observations at Chindwara on the 10th, as also at camp Muthoor on the 14th



idem, and again after my return to Seetabuldee, similar sets were observed on the 23rd and 26th October, with a few observations at camp Oomrait, on my way down from the hills. The result of all these barometrical measurements, combined with those taken by me with the same instruments at Chindwara, on the 1st March 1857, and at Seetabuldee on the 9th and 10th idem, gives.

*Above sea.*

Chindwara above Nagpore..	..	1122·3 and 2061·3
Oomrait above Chindwara..	..	454·8 and 2516·1
Camp Muthoor above Oomrait...	...	764·6 and 3280·7
or more correctly by mean of all the observations		
Muthoor above Chindwara...	...	1235·7 and 3297·0
And the Sanatorium above Camp	...	203·7 and 3500·7

3. The weather having been boisterous and rainy during a part of the four days of my stay at camp Muthoor, interfered considerably with the vertical angles, (taken as well as other trigonometrical observations, to ascertain the distance and altitudes of the Mahadeo peaks, of which the height is considerably over-rated,) and must also have affected the barometrical readings. The accidental fracture of the upper spirit level of the large theodolite, after I had observed vertical angles at only two out of five of my stations, also hindered me from insuring accuracy by obtaining multiplied data; but by way of establishing a check on my work, and ascertaining its true value, I have annexed to this report, one sheet filled with barometrical observations, one sheet of barometrical calculation based thereon, one sheet of horizontal triangulations, and one sheet of vertical angles; all calculated in details, so that they may be re-computed in the Surveyor General's office, if required.

4. The country for some miles round three sides of the village of Muthoor, is a table land, undulating and unencumbered with forest, though having numerous small eminences partially wooded. Much of the soil is tilled and a very large portion of it is covered with long grass intersected by small rivulets, the greater number of which runs dry in the hot weather; though the Pench river close to Muthoor, contains water all the year round. This table land is six miles wide at Muthoor, having an ascent of about 500 feet in  $\frac{3}{4}$  mile at its south edge from the village of Jamye, where the wheeled vehicles are left by pilgrims proceeding to the Mahadeo mountains,—and my loaded camels ascended this ghat.

even in its unrepaired state. The north-western descent close to Muthoor is, I believe, much more precipitous, and is probably double the depth of the southern pass. A rough section of the latter is annexed, taken with a perambulator and Aneroid barometer, as also a rough plan of the road for the last twelve miles from Boodhwarah to camp Muthoor.

5. The few hundreds of rupees placed by you at the disposal of the Executive Engineer of the Chindwara division, will enable him to make the present path practicable for doolies as well as for loaded camels: and the hill which I recommend for the site of the experimental Sanatarium, is already so accessible that I and Mr. J. H. Master, of the Madras Civil Service (to whom I am greatly indebted for his assistance during the above trip) rode on camels to its summit, without any path being cut for us. For convalescents approaching from Saugor and from the northward, the Doosawance Ghat is practicable for loaded camels; and for those coming southward from Jubbulpore and Nursingpore, the same route might be followed until a more direct one shall be opened by Nirhapoor.

6. The accompanying skeleton map, on a scale of 12 miles per inch, shows that Muthoor lies in the centre of fourteen stations, *viz.*, Sehere [114], Saugor [104], Dumoh [117], Jubbulpore [105], Mundla [117], Nursingpore [59], Hoshungabad [62], Baitool [50], Chindwara [28], Seonee [64], Bhundara [102], Kamptee [83], Nagpore [84], and Elliehpore [98], the respective direct distance of each being marked in brackets, and not one of them is 120 miles off, as the crow flies. The stations of Kamptee, Saugor, and Jubbulpore, are provided with accommodation for 4800, 4200, and 1000, European soldiers; and are distant 83104 and 105 direct miles, or about 9, 12, and 12 marches, taking nine straight miles for a stage, or at the outside from 13 to 14 marches, so that the sick men or convalescents of a force of 4000 Europeans, amounting probably to 200 men, and perhaps 20 women, might be conveyed to a healthy hill station 3500 feet above the sea, in half a month by the ordinary military marches.

7. There is abundance of ground near Muthoor, ranging from 3300 to nearly 3500 feet above the sea, available for building sites for private individuals who may wish to locate their families near the proposed Sanatarium during each hot season, or to recruit their own health without undertaking distant and expensive voyages to sea, (Calcutta being

(872) miles from Nagpore *via* Benares, Madras (704), and Bombay (514) miles,) or to the still more distant Sanatoria at Darjeeling, Landour, Mount Aboo, and Ootacamund, or elsewhere in the Neelgherry Hills. It is but a few days since the Superintending Surgeon informed me that a medical committee had on the preceding day recommended a European soldier to be sent for change of air to St. Thomas's Mount near Madras, a journey of 700 miles, instead of going 100 to Muthoor.

8. The high ridges lying to the westward of the village of Muthoor and of the station D, in my sheet of triangles, may on further examination, be found to be well adapted for a permanent Sanatorium, being somewhat higher than the site selected for the temporary or experimental establishment, or they might perhaps afford accommodation for a whole regiment of Europeans, should such a measure be found desirable hereafter, and therefore they ought to be held in reserve; no private individuals being allowed to build on them, nor should their integrity be marred by erecting any of the temporary buildings there. The same may be said of the high ridges east of the so called "Sanatorium Hill," on which latter locality, I recommend only as many temporary convalescent barracks to be built as will in the first instance accommodate 5 per cent. on the European force to be located at Kamptec, which may aggregate 1800 men and 200 women, or 2,000 in all.

9. The standard plan for a convalescent barrack has been slightly modified by me in communication with the Superintending Surgeon J. Maule, Esquire, and a copy of it is forwarded herewith. It contains accommodation for 16 men and 2 families or 2 non-commissioned officers, so that five similar barracks would hold 10 serjeants and 80 privates,—total 90 men, or just 5 per cent. on 1800 individuals. A sixth barrack might be required of the full size (97 × 47 feet, external dimensions,) as a hospital, for which a site has also been selected, and a seventh of little more than half that size for 9 or 10 women. A commanding officer's house, quarters for a subordinate medical officer, or guard room, commissariat store, and a few other buildings, would be wanted; but all might in the first instance be of an inexpensive nature, (even substituting huts for barracks, as detailed below in the 11th paragraph;) there being abundance of grass for thatching; bamboos not far off; and the valley of the Dainwah near at hand with a considerable supply of timber.

10. The huts or small houses occupied by the Gond inhabitants

of Muthoor, are said to cost about six rupees, and may perhaps be  $21 \times 12$  or 252 superficial feet; and as each barrack for 18 people covers nearly 5000 feet, it would be equal in area to about 20 such houses, and perhaps to 3 of them in height, or 60 houses in all; and if their cost when built by the Public Works Department were double that incurred by the hill people, a single rough barrack for 18 men would cost rupees 720, or the price of 120 Gondree huts. With three chimneys of brick-work in lime, five doors, and twelve windows, together with foundations and plinth of rough stone, and superstructure of sun-dried bricks in mud, each barrack would probably cost more than 1000 rupees, though 720 might be sufficient by using wattle and dab for the walls, and other economical expedients.

11. At the rate assumed in the preceding paragraph, 5000 rupees would furnish six cheap convalescent barracks and a hospital, to which rupees 4000 more might be added for the other buildings mentioned in my 9th paragraph, including the forming tanks for water, cutting roads, laying out soldiers' gardens, &c.; but if instead of lofty buildings to hold 18 men each, the platform measuring  $98 \times 48$  feet, with walls  $2\frac{1}{2}$  feet thick of rough stone, was made in the first instance to hold 18 huts, each 12 feet square (in pairs, but separated by a party wall one foot thick) with 4 transverse lanes,  $5\frac{3}{4}$  feet wide, and 4 longitudinal paths of 3 feet, every man would have a house to himself, and would probably be well sheltered at one-third or one-half the expense of a barrack. A sketch is annexed, showing the way in which a cluster of 9 double huts might be arranged for 16 men, who would use the central hut in front for messing.

12. The distances measured by me between Kamptee dāk bungalow and the staging house at Chindwara, amount to 77m., 0f., 62yd., and it is 36m., 0f., 211yd., from the latter place, *via* Oomrait to camp Muthoor, making a total of 113m., 1f., 53yd. But instead of losing an entire march by going round through Chindwara, it appears better to adopt the pilgrim road from Oomrait through Budnoor and Mohkair to Talao, by which I returned from Muthoor, over very favorable ground and which reduces the distance from Kamptee to Muthoor to 101m., 2f., 126yd. This line is marked by red dots in the map, as are the unknown portions of the routes between Muthoor and Saugor, and Muthoor and Jubbulpore, concerning which I am already in correspondence with the Chief Engineer of the Saugor and Nerbudda territories, and with the Deputy Commissioner of Hoshungabad.

13. The Executive Engineer of the Chindwara division should be instructed to fill in all the topographical details of the table land, as far as the foot of the Doosawanee Ghat to the northward, (that village being perhaps 3 miles east-north-east from the Sanatarium, which is a mile and a half or 2 miles north from the village of Muthoor,) and for 3 or 4 miles south-west from the temporary Sanatarium, including all the high ground mentioned in the 4th paragraph, near the source of the river Pench; and after the arrival of the two Native sub-surveyors, now on their way from Roorkee, they might explore the unknown routes from Muthoor to Samlahkera, and from Surrye *vid* Jamye and Muthoor to Mowaljeer within the Chindwara district, and even *vid* Futtehpoore and Oomurda to Purtabgurrh in the Bhopal territory, on the road to Saugor, if the Commissioner and the Chief Engineer of that province have no objection to their being so employed.

14. The Executive Officer, Captain Saunders, might also be instructed to frame an estimate for convalescent barracks and other buildings which would be required if 100 convalescents from Kamptee were sent up to Muthoor; and if this place were established as a Sanatarium for the European troops at Saugor and Jubbulpore, as well as those of the Nagpore force, about double the number of persons would have to be accommodated, though perhaps one medical officer with one subordinate would be sufficient for all,—and the assistant surgeon might prefer providing house-room for himself to having 30 rupees deducted monthly from his pay as house-rent.

*Memorandum by Captain G. F. PEARSON, Superintendent of Forests, on the portion of the Mahadeo range of hills lying between the parallel of Shahpoor in the Baitool District, and of Chuprah in the Seonee District.*

ON the 12th December I left Shahpoor in the Baitool district, and marched 11 miles and 5 furlongs to Pandea, a village at the foot of the Raweendeo Hill near Saleya, and on the 13th, I crossed the Towah river and proceeded to Kuttingee, 5 miles further.

I was employed nearly the whole of these two days in searching along the bed of the Towah river for the out-crops of coal mentioned as existing here in Mr. Medlicott's geological report on the district; and I did not find them for a long time, owing to their position not being quite accurately defined in the report, and also from being misled by

finding numerous pieces of coal in the bed of the stream some miles higher up, which must have come from other out-crops, which though not known of at present, and which I was unable to find as far as I went, must undoubtedly exist, as a bed of sand in the river near the village of Bareilly is largely impregnated with small pieces of coal, which must have come from somewhere above.

I at length found the out-crops I was in search of, which are well away under the west (not the east end) of the hill, and which commence about 300 yards below the crossing of the river at the Dootara Ghat, close by the village of that name. The sandstone which higher up the stream lies in irregular continuous beds, here assumes regular layers, under which the clayslate is at once seen, and below this the coal, which may be picked out in large lumps by the hand. There are numerous out-crops extending full a mile down the stream, and the beds average about 3 feet in thickness. The coal is some of the best I have seen in India, very bitumenous, and burns freely and brightly, throwing out abundance of gas. I am however quite incompetent to speak of the real value of the bed, or the quantity of coal it might be expected to turn out. There are however undoubtedly other beds as I said, higher up the stream.

On the 14th December I marched 10 miles to Asseer, and encamped in the dense jungle under the north-west corner of the hill, on the banks of the Kairunja Nullah, a small stream of excellent water. A better and less jungly spot to pitch in, as I afterwards found, would have been at the east end of the hill, on the banks of the same stream, and on the site of the deserted village of Ummerpatah, on the direct path from Kuttingee to the little Gond village of Koondée, which is 3 miles further on. The whole jungle at the foot of the hill is very dense and full of timber tracks.

Between Kuttingee and Asseer Hills there is no good timber. The jungle chiefly consists of *Mowah* and *Saj*; but the trees are of indifferent size, and timber does not seem to thrive here, being both stunted and badly grown. There are some fair-sized teak trees on a ridge which is crossed about half way to Asseer, but there do not appear to be any considerable amount of them. But immediately below the fort, there are some few exceedingly fine trees of Tendoo (Ebony) and "Jumrassee," a close grained white wood, valuable for joiners' work, as also a tough elastic wood called "Karee", which however seldom attains

any great size ; but for the rest the jungle though dense would only furnish wood for inferior purposes.

It appeared to me that the soil between the Towah and the small range above alluded to, is exceedingly rich and capable of the highest cultivation. The grass which grows on it seemed exceedingly fine (not coarse) and full of nourishment.

On the morning of the 15th, I went to the top of Asseergurh : it is a saddle-backed hill lying nearly due east and west, the two ends being surmounted each by a conical hill like natural bastions elevated above the central plateau. From end to end the hill is about one mile in length, and from the eastern end of it there is a third spur running out nearly at right angles to the north, but having a less elevation than the hill and separated from it by a narrow ravine. The hill is naturally scarped all round, and is utterly unapproachable from the south, as well as from the east and west ends of the hill itself. On the north side of the hill where the scarp is less, the summit is crowned by an old rampart for nearly the whole distance, but this is fast falling to decay.

There are only three ways of access to the fort, two on the north and one at the north-east corner. The first of these, the "Kirkee-Durwaza," is very difficult and practically useless, being a mere goats' path up the scarp ; the second, also on the north side is by the "Borhanpoor Gate." The path up to this lies along the side of the vast semi-circular ravine, formed to the north of the hill by the third spur above alluded to. It is rough and difficult but not steep, and at the summit opens into a rather broad ravine, which has been built across. The gate and bastion have however been destroyed.

The third ascent is up the ravine at the north-east corner, formed by the third spur and the eastern end of the hill. Up this the pathway creeps ; it is considerably the easiest, and up this elephants used formerly to get into the fort ; and though the road-way has been washed away in many places, no doubt an elephant might get up still for a great part of the distance. There are however two complete lines of fortification across the ravine, with massive stone gateways, all in good preservation and perfect order, only wanting the gates. The first of these is just below the summit, and is called the "gate of Gunnesse Koer ;" the second and strongest is about 300 feet lower down, and is called the "Alce Durwaza."

On the top of the hill there is abundance of water in several tanks and bawlees. There were also some buildings of considerable extent, but they have now fallen down, and the only one still left is a bomb-proof powder magazine, which was very strongly constructed and complete with wooden lines for the powder, which still exist.

The fort is perfect as a military stronghold, if only properly provisioned and defended; but I do not think the Natives have ever found this sort of forts of much use in modern days.

From the river where my tent was pitched to the Borhanpoor Durwaza is an ascent of 600 feet, from thence to the central plateau 150 feet, and from the central plateau to the summit of the conical hill on the west end of the fort, 270 feet—total height of the hill 1080 feet. The summit of the hill (west end) is about 2,470 feet above the level of the sea, or about 300 feet less than the summit of Bowergurh.

The maps of this part of the country are exceedingly incorrect, so much so that it is difficult to depend on them at all. Mr. Medlicott's geological map is far the best, though the names in it are not always correctly spelt; but it is the only one that can at all be depended on.

From the west end of Asseer

The Baradeo Peak bears	...	..	N. W. by W. $\frac{1}{2}$ W.
The Beil Kunda peak over Korce	...	...	N. N. E.
Bowergurh Fort	..	..	W. by S. $\frac{1}{2}$ S.
Doopegurh peak (Puchmurree)	..	..	N. E. by E.

From the east end of Asseer

Rawendeo Hill (east end)	..	..	... S. W. by S.
Burimai Peak	...	...	East $\frac{1}{2}$ North.

After descending the hill I marched on by Rampore, 5 miles—Kotapance, (deserted) 2 miles 3 furlongs, to Buttoreca 3 miles—total 9 miles 3 furlongs, not however reaching my tent till late in the afternoon. The whole distance is through dense jungle; but until you arrive at the village of Rampore the timber is not generally large or valuable. Rampore is a neat looking Gond village, on an eminence, from which there is an exceedingly beautiful view up the richly wooded valley of the Sonebude River, with the heights of the Puchmurrees in the distance; and the whole scene, with the now changing shade in the



• colour of the leaves and foliage of the forest, strongly reminds one of scenes in other lands.

From Rampore onwards down the valley of the Sonebude River, there are a great number of fine and well-grown young teak trees all the way. These, though not yet quite fit to cut for timber, will come in after a few years, and should be looked to. They now average about 2 feet in girth; but the Patail of Rampore told me that higher up the valley there were some fine trees. There is also some good Saj Tendoo and Hurdoo in this jungle; indeed it is very desirable that the valley of the Sonebude should be searched from Rampore up to its source for timber.

On 16th of December I marched from Buttorea by Larma, 2 miles 5 furlongs—Pupurea (deserted) 1 mile—Kodree (deserted) 1 mile 5 furlongs to Baree 3 miles—total 8 miles 2 furlongs.

From Buttorea as far as Larma, the path lies along the valley of the Sonebude river, and from there it runs up a narrow ravine, forming the bed of a stream,—a feeder from the Sonebude by Kodree to Boree. At Larma there is a clump of magnificent teak trees, one of which I measured was  $7\frac{1}{2}$  feet in girth; and from this point the Boree teak forest is entered.

This teak forest entirely covers the hills east of the Sonebude, stretching from Larma down to Malvee near the junction of the Sonebude and Dainwah. From Larma eastward it includes the villages of Majoora and Bodye, extending to Baroon, about 8 miles east of Baree. In breadth from the Sonebude, it will vary from 12 to 16 miles, and extending north from Larma to Malvee, from 16 to 20 miles—a good part of this is in Hoshungabad. However, the villages in the Chindwara district included in the forest, which are now inhabited, only seem to be Baree with Hurrapillah and Jalee to the west, Bodye and Baroon to the east, Majoora to the south-east, and Larma to the south-west. The best and most valuable teak is found to the west of Baree. To the east of Baree the jungles are less valuable, but there is much teak on all the hills.

But although these hills are covered with teak jungle, there is but little good timber left in comparison to what had formerly existed. No doubt over the hills some thousand teak trees may still be found fit for felling, especially the larger trees at the top of the hills. But the

relentless excess of the Gonds and Koorkoos have committed a havoc which it will take many years of careful preservation to repair. There are thousands of young trees every where, which vary in size according to the number of years. The spot has been spared from cultivation; but there are few spots which have been spared entirely, where the trees are entire, and for the most part the large trees which are still standing, are those which it has been too much trouble to the Koorkoos to fell.

It would seem hard to prohibit these poor people from cultivating altogether; nor, as there are but a few villages over a large tract of country with a few huts in each, would it seem necessary to do so. But I think no time should be lost in setting apart the best hills, on which the most valuable timber at present exists, and on which the best and straightest young trees appear to be growing up, and rigidly preserving them from being touched. A sufficient space of hill might then be set apart and made over to the villagers on which they could cultivate after their manner. On enquiry it appears that when they have felled and burnt a patch of jungle, they can cultivate the same patch two years in succession; while it takes from 6 to 8 years for the jungle to grow up sufficiently for them to cultivate there again: so they require space enough for them to have at least successions of fields. This seems dreadfully wasteful, but it would be difficult to break them, in a day, of a habit which they and their ancestors have practised through ages, or else there is no reason, if they were assisted with bullocks, why they should not learn to cultivate the rich soil at the bottom of valleys.

In speaking of the Koorkoos, I may mention that they seem to differ essentially from the Gonds, while they rather resemble the Hindoos. They will not touch the flesh of the cow, nor even of the bison, and they will not accept a hookah from the Gonds nor eat with them. They have however no connection with the Bygars or Bloomeahs who inhabit the Ummerkuntuk plateau, and resemble them only in their manner of cultivating with the axe. But the Bygars never cultivate with the plough, while the Gonds do so in Mundlah; and the Koorkoos and Gonds both seem to do so occasionally in these hills. The Koorkoos seems to me probably to be the offspring of Hindoo fathers, who have settled or been driven into the hills, and have mingled with the Gonds. I think myself it would be a good plan if an attempt were made gradually to break these people off their most destructive habit

of axe cultivation. The sal forests east of the Barmeye in Mundlah, equally with the teak forests here, have been almost entirely destroyed from this cause.

As regards the use to which the teak in this forest may be put, I think the railway people might be allowed to have some of it under restrictions. They will be able to get it down the Sonebude and Dainwah to Bagra; and if they are not allowed to have it, I do not know where they are to be supplied with teak, as very little is left anywhere. It might also be certainly made available for the use of the Department Public Works at Nagpoor, provided Government elephants could be used to drag the logs as far as the ridge south of the Asseer-gurh fort. I do not think the expense of conveying it from thence to Nagpoor would exceed one rupee per foot, especially if proper timber carts were built by the Department; but elephants would certainly be required to get the logs out of these hills. The only plan which I would earnestly deprecate is the practice of giving advances to petty Native contractors to cut for the Department. This has been the cause of ruin to the forests every where. They cut two-thirds for themselves and one-third for Government, and they chop the trees up into little pieces to enable them to get them out the easier. Whatever plan is pursued, the timber should be cut by servants of Government. All the spare pieces besides the logs, carefully stored up, and then as opportunity offered, or when elephants could be made available, the wood might be fetched away. A few pairs of buffaloes would do to collect it in convenient places in the forest, where rough huts should be built over it for its protection.

I would also add a caution for the careful exclusion of the Borahs from Seonce, (Hoshungabad) and other timber speculators, who even more thoroughly than the Koorkoos, have ruined the Baitool teak forests. At present there are a great many trees cut here by some of the railway people at Bagra, which they are even now conveying away under apparently no restriction; and I know not, and the people here do not seem to know, under what authority,—who they are,—or any thing about it.

On the 17th December I marched from Boree up the Rosee Ghat to Puchmurree. This is a very severe march, 13 miles and 7 furlongs including the Ghat, the ascent of which is 2150 feet over four miles, in two portions. After leaving Boree the road runs up the valley, past Eklama and Babye, and then crossing the stream the ascent is commenced and

extends over 3 miles to Rosee Ghat village, which is 8 miles from Boree. Here there is a considerable plain and plenty of cultivation. The upper portion of the ascent is, after passing Rosee Ghat village, very steep in places, and after reaching the crest of the hill, the ground is very bad for about a mile, when the plains of Puchmuree are attained. Here there is a fine level plain from 4 to 5 miles broad either way, covered with Hurra and Beeja trees ; but I was disappointed in finding the Sal, which exists, and which I was led to expect, grew up here of such indifferent quality. The ghat may be considered practicable for all animals carrying half loads, except camels.

I make the village of Puchmuree as 3350 feet above the level of the sea ; but I went to the top of Doopgurh, the highest of the many rough and precipitous sandstone peaks which surmount this group of hills. The summit of this heap is 900 feet higher than the Puchmuree plain, or as nearly as possible 4220 feet above the level of the sea, and there is a plain of a mile in extent at least, very nearly on the summit of Doopgurh. From this peak the whole map of the hills, as well as the Nerbudda valley, north and north-east as far as Sohagpore, and stretching away to Nursingpore, lies at your feet. It was very clear the morning I was up there, and the wheat fields and villages all along the valley below were clearly visible to the naked eye, stretched out like a huge panorama. To the south the Doosawnee range is seen, separated from the Puchmurees by the valleys of the Dainwah and Sonebude, which taking their rise near the Borimai peak, due south of you, flow on round the range to the east and north, the other to the south and west, and meet again to flow into the Towah at Bagra, thus cutting off the Mahadeo Hills from the general mass of the upland country, which forms the southern barrier of the Nerbudda valley, and constituting them as it were an isolated group by themselves.

One cannot help being at once struck on looking across at the Doosawanee range, at the difference in the formation of that range, from the one on which you stand. There no longer are seen the bold outlines and precipitous cliffs which mark the sandstone formation of the Puchmuree Hills, nor the isolated peaks which tower above them ; but instead, the rounder hill of the trap formation, which seems to prevail generally throughout the whole of the upland country to the east of this point.

On the 19th December I left Puchmurree and descended the Tara Ghat to Bowun on the Dainwah River, a distance of 8 miles 2 furlongs. The descent commences 3 miles and 1 furlong from the village of Puchmurree, and extends over 3 miles, and is a descent of 1740 feet almost without a break in it. I think no animals except elephants could get up and down this ghat with any loads; but my elephants came down laden though not heavily.

There is an ascent of 350 feet to the crest of the ridge, which is 3700 feet above the sea; and after descending 350 feet you come to the Mahadeo cave, the great place of pilgrimage, where a feeder of the Dainwah issues from a low cave about 50 yards deep into the hill. There is a ravine and a slight break in the descent here. There is a small village at the foot of the ghat named Nandia,  $\frac{1}{2}$  mile before you get to Bowun.

From Bowun I marched on the 20th through Omreah or Jaman-doongree, (the residence of the Almode Thakoor) 5 miles 6 furlongs, and Bakherree, 3 miles and 2 furlongs, to Delakaree 4 miles 4 furlongs—total 13 miles 4 furlongs. Here is a police thannah. On quitting Bowun there is a fair amount of teak along the valley, not large however; and plenty of fine saj and sal trees are observable on the slopes at the foot of the Puchmurree escarpments. But after quitting Omreah, the sal which has been hitherto stunted and ill grown, becomes much finer; and between Bakherree and Delakaree the path passes through a very considerable forest, consisting almost exclusively of sal trees. In the afternoon I went out again and found that this sal forest extends for many miles to the west and north from Delakaree; and though it is not by any means equal to the Mundlah sal forests in the size and straightness of the trees, yet there is no doubt, owing to the ease that it might be worked with, and the timber got out in the direction of Futtehpore, that it is of almost incalculable value. A large proportion of the trees are no doubt small and ill grown, but at the same time there are a great number of very fine trees indeed, out of which long beams of almost any scantling might be cut. I myself saw many hundreds of such trees. I cannot pretend to say on so short an inspection, what amount of timber this forest contains, but the people tell me that it extends in a north-west direction as far as the line of hills which run between the Dela-

karee valley and Mowaljeer ; and if so, there is a vast amount of it, and it will well repay attention. I am not aware that the existence of sal in these hills was practically known before. It seems to extend close up to the foot of the Puchmurrees all the way along their east side ; but the size and growth of the trees certainly very much improves as you go down the valley further north ; and indeed the value of the forest very much depends on the size of the area in which it really thrives, as the whole extent is very large indeed. I place very great importance on this forest, as there can be no doubt that before long, teak will be scarcely procurable in the country at all.

On the 21st I marched further down the valley through 2 or 3 little Gond villages to Bowany on the Doodhye river,—a good sized Gond village belonging to the Hurrye Iloqua, distant 13 miles 3 furlongs from Delakaree. I hoped to find that the sal extended along the foot of the other range to the south, but I lost here all trace of it. It seems to stick to the east end of the Puchmurree, and along the banks of the Dainwah and its immediate tributaries. The jungle here is very dense all the way ; but the only timber trees of any value which I observed, were some fine Beegahs. There is a great deal of log, but it is generally of indifferent size.

On the 22nd I turned eastward, and crossing the Doodhye River, marched up the Chakla Ghat by Nirhapore to Champa Khera, a distance of 19 miles and 3 furlongs. This place is situated in the upland country of Butkagurh, 2500 feet above the level of the sea, in a broad open undulating country covered with grass and open jungle, and is 2 miles east of the Seetarancee River, and about 3 miles from Buka Kappa.

I observe that all the Gond villages in these hills have wheat cultivation about them, and the crops seem thriving and the soil abundantly fertile. Below the ghats in the Doodhye valley by Chakla, and the adjoining villages, the wheat cultivation is very extensive. Chakla is 3 miles 7 furlongs east of Borubany. The ascent of the ghats commences immediately on passing Chaklas, and rises 1100 feet over four miles very gradually, when the road emerges into a broad valley locked in by hills, and after passing along this valley 5 miles, comes to Nirhapore. I should think this valley was well watered and rich in its soil ; but except Nirhapore the villages seem all deserted. After passing Nirhapore, the ascent again commences, and over  $2\frac{1}{2}$  miles rises 500 feet more, till at

2750 feet above the level of the sea the crest of the ghats is reached : after that there is a slight descent into the valley of the Seetaranee River, (which flows into the Nerbudda at Gurrawara) and from thence you emerge at once into the open hilly country, the Bulkagurh Iloqua, which resembles in character the whole of the upland country of Seonee and Chindwara, being low stony hills sparsely covered with jungle, divided by valleys which are generally well cultivated. To the north it appears to be more open with broad grassy plains.

It is curious to observe that while after crossing the Doodhye near Chakla, you come on to a trap formation of which the hill is entirely composed, the sandstone of the Mahadeo appears again in the Nirhapore valley above the first, where several hills are composed of it, while the ghat again beyond Nirhapore is all trap.

There is very much valuable timber along all this range of hills : there is a good deal of teak, though low down in the hill. The good trees are all cut, but high up and especially on the Champa Khara side many fine trees are left. There is a fine Saj forest all along the bottom of the hill, in the valley of the Doodhye, and there is abundance of good Beeja and Tendoo on the hill side. Mr. William is now cutting sleepers in the valley below.

There are also several fine Sheshu or black-wood trees : there is a clump of these just at the crest of the range above Nirhapore,—and one tree, the largest I ever saw, about  $\frac{1}{4}$  of a mile east of the Seeta River, which measures  $3\frac{1}{2}$  feet across and 5 feet from the bottom. If sound it would give a slab of very great value. This timber would no doubt all be difficult to get out of the forest, but there is nothing to hinder its going either to Chindwara or Nursingpore, as far as I see. But the country all belongs to the jagheer of Butkagurh and Kospan : the residence of the Thakoor is one koss from Champa Khara.

*N. B.*—This ghat presents no difficulty for guns being taken up or down if required. Any difficulty that exists might be removed by beldars in a few hours ; and the place likely to be so is just at the head of the first ascent from Chakla,—and there is a road from Chakla to Garrawara in Nursingpore. I cannot help remarking that in the large map of the Saugor and Nerbudda territories, the course of the river is all wrongly represented, and the map is no guide at all to the true configuration of the country.

On the 23rd December I proceeded from Champa Khera, east, a little south, through Banka, 4 miles 3 furlongs—Kotiah 3 miles—Dunora 1 mile 5 furlongs—Bowka  $3\frac{1}{2}$  miles, to Simmeriah 3 miles—total 15 miles 4 furlongs.

The road lies all the way over a series of low ridges, divided by broad valleys, the hills being everywhere covered with trap boulders to Banka, where a tolerably high ridge, a spur of the Richera Hill is crossed to Simmeriah, which is in the plain of Oomerwarah. The whole of the plain (crossed to-day) is between 2000 and 2500 feet above the level of the sea, and the villages are good for Gond villages, and seem to have abundant Rubbee cultivation. There is an abundance of teak scattered over every hill for the whole distance which I passed over to-day—every hill is covered with it. I saw but few large trees it is true, as no doubt all near at hand have been cut, and moreover very many of them are crooked and indifferently grown; but a great quantity of timber in short length might be procured here at once, from trees which will not improve, though generally speaking it will be several years before the trees sufficiently recover themselves to furnish good beams. The best trees are westward about Banka, Champa Khera, and the Seeta River: the whole is in the Jagheerdarces of Butka.

On the 24th December I marched across the broad fine plain of Oomerwarah, 22 miles to Chindgwah, in the Seonee district. This plain averages all across full 400 to 500 feet above the general level of Seonee, and Chindwara itself. It is covered with villages surrounded by fine cultivation. The hills wherever they are, appear to be only covered with low scrub jungle, and there is no timber on the plain.

From Major W. C. ERSKINE, C. B., Commissioner of the Jubbulpoor Division, to Sir G. COUPER, Bart., C. B., Secretary to the Government of the North-Western Provinces,—(No. 85, dated Jubbulpoor, the 25th April 1861.)

WITH reference to my letter No. 69, dated the 5th April, sending you reports I possessed regarding the Puchmurree Hills as a site for a Sanatorium, I have now the honor to send you the following extract of a private note just received from Mr. Blackwell, the Manager of the Nerbudda Coal and Iron Company.



2. It is dated the 18th instant, from Puchmurree; and Mr. Blackwell is at present residing there in a tent.

"Finding Mohpance intolerably hot, (thermometer 110°) I have come here for the hot weather; and as these hills have been a good deal talked of, you will perhaps like to know how I find them."

"Since I came here on the 14th, the thermometer has ranged from 66° to 91°. Nights, mornings, and evenings, delightful—from 10 A. M. to 4 P. M. rather warm, but not at all oppressive, a fresh breeze constantly blowing."

"It has been generally cloudy since I have come up here, and I can walk and ride at any hour of the day."

"The Natives say we shall have rain in a few days, and that afterwards it will be colder. On the whole the relief in coming from the plains is immense."

"I am at an elevation, by Captain Pearson's observations, of 3,540 feet; but the highest point of the hill is 4,530 feet; and sites for bungalows might be found up to 4,300 feet."

"The hills are most picturesque and the ground perfectly open, so that one can ride or walk in every direction."

"The distance from Nursingpoor is about 80 miles—the ascent practicable for bullocks or camels, and presenting no difficulty whatever for elephants."

From F. WILLIAMS, Esq., Commissioner, 1st or Meerut Division, to Sir G. COUPER, Bart., C. B., Secretary to Government, North-Western Provinces,—(No. 231, dated Meerut, the 20th July 1861.)

I HAVE the honor to submit such remarks as I am able to offer regarding the Sanatoria of Landour and Mussoorie, as requested in your letters of the 28th March, No. 497A and No. 1535A, dated 21st ultimo, (General Department.)

2. The distance of Landour from Meerut is about 125 miles not 80, as is stated in the printed papers.

3. From Meerut to Roorkee, there is a good metalled road: from Roorkee to the entrance of the Shorepoor pass, in the Siwalik or Sub-Himalayan range, a new road has been constructed but not yet metalled.

The material for metalling is being collected ; and with sufficient funds this portion might be completed and made as good as the part between Meerut and Roorkee, in the course of next season.

4. The line has been kept on the right bank of the Solain River, the main body of which issues from the Shorepoor pass, and is swelled by four large tributaries. On the old line of road, 3 tributaries had to be crossed, and the river itself three times : on the new road there are only one moderate and one small tributary. The river is altogether avoided, only one bridge of about 300 feet water-way, one of 90, a drawbridge of considerable water-way, and a few small culverts, are required to make this road passable in the highest flood. They should be built during the next working season.

5. The pass was a most serious obstacle : it is the bed of the Solain, down which, after heavy rain, a torrent 3 or 4 feet deep, for the whole width of the pass in the narrow parts, rushes with a velocity of nearly 10 miles an hour.

In dry weather there is only a trickling stream ; but the bed of the pass was deeply scored by the rush of water in the rains ; and a cart track had to be annually made by removing the large boulders and stones which otherwise rendered the passage of wheeled vehicles impossible. The entrance into the doon was further impeded by a very steep ascent and rather sharp descent, over the high stony crest of the Siwalik range. This obstacle was with difficulty overcome by laden carts when the cart-men assisted each other by yoking the bullocks of 2 or 3 carts to one.

6. A raised causeway along the centre of the pass, of which about  $3\frac{1}{2}$  miles have been nearly completed, is in progress, and has stood, without much injury one of the heaviest floods which has been known for years.

7. The entrance to the doon will be effected by a cutting which is well advanced, in the approaches to which the gradient will be no where more severe than 1 in 20, and that only for a very short distance, —the general slope of the road being 1 in 33. When these works are finished, travelling carriages will pass easily into the doon.

8. There is a very good road through this valley itself to the foot of the Himalayan range at Rajpoor. There is only one obstacle in this

part of the line between the town of Dehra and the Siwalik Hills,—a shallow bed of Sub-Himalayan drainage generally dry, and very seldom impassable even in the heaviest rains, and then only for an hour or two, which might be easily bridged.

9. The ascent from Rajpoot to Landour and Mussoorie, is at present accomplished along an old very steep and narrow road; in fact a succession of zigzags which could never be made passable for carts. Almost all stores and supplies for the depôt, and the baggage of officers and men are carried by hill porters.

10. A new road, known as Mr. Mackinnon's road, has been opened from Rajpoot to Mussoorie with a branch to Landour. The general gradient in the lower half is 1 in 20, in the upper half 1 in 14, and that of the branch to Landour, 1 in 12; but there are short distances in each section, the gradients of which are more severe. Those of the lower sections might be easily corrected. The width of the road at present is generally about 12 feet. There are some places where it is more, and some where it is only 7 or 8 feet, still laden camels and trucks drawn by one or two bullocks, easily accomplish the ascent, though owing to the road being so narrow and unprotected by railing or parapet, one or two accidents have happened to animals and carts.

11. The line has been examined and reported on by Mr. Login, Civil Engineer. I have not succeeded in obtaining a copy of his report, but I understand that he has recommended that on the lower section the line should be maintained, and the road widened to admit of its being travelled by common carts; and that he has suggested a new line from the head of the lower section to Landour, on which a similar gradient of 1 in 20, if not a more favorable one, can be maintained.

12. The Municipal committee are, I believe, content to undertake to finish the upper section to Mussoorie, widening it and making it secure with parapet walls, if the lower part is completed by Government.

13. There is no doubt that as good a road might be constructed to Mussoorie and Landour as the one which has been opened to Simlah. The length of the line to Mussoorie would be only about twelve miles,—to Landour about 15. The distance from the foot of the hills to Simlah by the grand Thibet road is, I believe, 52.

14. If the Municipal committee of Mussoorie construct the last portion of this road at their own expense, till a better road is made goods could be carted by that line to the foot of the Landour Hill ; and a carriage road so far would be secured, if Government would sanction the expenditure of a moderate sum on the improvement of the lower 6 miles.

About rupees 16,000 have already been expended on this road.

15. The saving to Government in porter hire would be considerable, if a good cart-road were opened to Landour : there would be a further saving of rupees 1,500 per annum, the charge for the annual repairs of the existing bridle-road ; and it would be the best economy undoubtedly to face at once the cost of the road to Landour ; but if that is not approved of the lower part of Mr. Mackinnon's road should certainly be completed, for something must be done.

16. But for the partial establishment of a Truck Company, the annually increasing inconvenience to the public from the scarcity of porters, would this year have reached the climax. In the present state of the roads, this scarcity cannot be met, as it should be by the employment of animals and carts ; and the local authorities and commissariat officers anticipate the utmost difficulty in future, in providing the requisite amount of porters for the carriage of the baggage of the men of the dépôt. The only prospect at present of the emergency being met is in the increase of hire attracting more porters. Individuals with a small amount of baggage, and an urgent necessity for getting it on, will run up the rates to an extent which will enhance the cost to Government of carriage of stores, baggage, &c., to such an amount that no other argument in favor of the completion of a cart road will be wanted.

17. There can be very little choice of lines. It is not likely that another will be found that should be preferred over the one, part of which has been already nearly half made ; and it would be a pity to put off the construction of a road for years, as was the case with that through the Siwalik range, pending the decision regarding conflicting propositions.

18. I believe that even with the disadvantages of insufficient hospital accommodation and unsuitable ill ventilated and often over crowded barracks, there has never been any question regarding the climate of Landour. "The drainage is excellent." From its

The value of the existing Sanatoria at Landour.

height and commanding position it is swept by every breeze. "It possesses a remarkable immunity from hill diarrhoea. There are chalybeate and sulphureous mineral springs within a distance of 7 or 8 miles." Such are the few general remarks regarding it in the printed papers.

As a *dépôt* for convalescents and invalids, it is already held in high estimation.

19. The number of soldiers annually enjoying the benefit of this Sanatoria has been small, perhaps partly owing to want of barrack-room for more, and partly perhaps owing to other Sanatoria more convenient, with reference to the existing stations of European troops, having been established.

The possibility of making greater use of the Sanatoria.

20. The last cause will operate permanently. There are Sanatoria in the hills for the Punjaub and Nynce Tal. Perhaps one of the best of the hill stations will be the best locality for the invalids of the force in Rohilcund and Oude. No Regiment can be removed to the hills from Agra, Delhi, or the Upper Doab. The *dépôt* at Landour already apparently affords accommodation for the sick of this last division. All that will be required will be room for men on temporary leave, if the great boon of short furlough to the hills in the hot weather is extended. Although at present there are no quarters at Landour for such men, and but small unoccupied space, ample room could be secured by purchasing and slightly altering some of the private houses which have been built within the limits of the Landour cantonments.

Means of giving occupation and amusement.

21. The means of giving occupation and amusement to the invalid and convalescent soldiers are at present small.

Some of the barracks have gardens. There is space generally close to each for a game of quoits. There is a covered fives-court, and small thatched skittle alleys, and a good and nearly level road for exercise round the three hills into which Landour is divided by two gorges in the range.

22. There is no open flat space for military movements or for games requiring room, such as cricket, foot-ball, &c., nor could one possibly be made in any part of the Landour cantonments. The only ground in the neighbourhood suited for such a purpose, is the old

Botanical Garden ; this would perhaps be considered too far and too low.

Sanatory arrangements. 23. The sanatory arrangements at Landour are generally satisfactory.

24. There is ordinarily, and has been this season particularly, a serious deficiency of water. The only spring in the dry weather is in the valley between Landour and Mussoorie, at the very foot of the Landour Hill to the east of the bazar ; and considerably below that an expensive establishment of mules is maintained by Government for the carriage of water from thence to the barracks and hospital.

The Municipal Commissioners of Mussoorie are now carrying a water course from nearly the foot of the Landour Hill to the west of the bazar ; but even if that afforded a sufficient supply for Mussoorie alone, which is doubtful, it will be so little above the level of the present Landour spring that it would be of little use to the dépôt.

25. There is a small perennial stream in a valley to the north of Landour, from which water might perhaps be brought by a canal carried round the side of the hill to a point much nearer the level of the hospital than that of the spring under the bazar. This stream and line might be examined.

26. In the present state of the finances, it is almost useless to mention such a work ; but I think a line of levels should be taken (as that would not cost much,) from a point high up in the bed of the Ooglar River, which runs between the Landour and the Nagh Tibba ranges to Landour. This river which joins the Jumna under Budraj, has a very rapid slope and a good supply of water, quite sufficient for both Landour and Mussoorie, even if an aqueduct were taken from near its source ; and it is possible it might be brought to a convenient level, from which water might be pumped up to Landour. It certainly could be carried to the level of the mall at Mussoorie. This may turn out to be a very crude proposition, but the great want of Landour has suggested it.

Roads. 27. The only road at Landour is the one which has been already mentioned going round the three hills. This is reached by two lines of approach from the bazar ; one a circuitous and tolerably easy ascent, the other a very steep zigzag, directly up the face of the hill. I believe Mr. Login's report contained a proposition

for two branches from the bazar reaching the level of the present circular road by a gentle gradient—such lines would be a great improvement.

28. Three places, considered suitable for the establishment of a depôt, should Landour be on any score objected to, have at different times been thought of.

Suitable places for the establishment of new Sanataria.

29. One is the present site of Mr. Mackinnon's brewery and the surrounding heights. The brewery is situated on a tolerably extensive piece of flat ground with an excellent stream of water running through it. Another is the estate called "The Park" not far from Mr. Mackinnon's.

But all this ground is pre-occupied, and the charge for compensation would be so great, that if extension is contemplated it would perhaps be as cheap and certainly better to purchase property at Landour.

30. Budraj, a fine large hill overlooking the doon with wide spreading spurs, is the third place thought of. The highest points are about 7300 feet above the sea, that is, a little lower than the top of Landour, which is 7600. The centre of Budraj is about 2 miles from the extreme western point of Mussoorie, and about 9 from the hospital end; *i. e.* the east of Landour. There would be ample room on this hill for one or two regiments. The spreading spurs and various aspects offer the advantages of localities, with considerable range of temperature. There is one flat space of some extent sufficient for a parade or cricket ground, not very much below the top of the hill, about the level of the circular road, which would probably be laid out to give access to the different spurs: at a lower level there is much favorable ground—the climate would be good.

But there is one great defect,—want of water: there is no large supply. The springs are as far below the summit of Budraj as those at Landour are from the top of that range.

31. Eligible sites for Sanataria could doubtless be selected in the Jounsar Bawur Pergunnahs, but I have not thought it necessary to take them into consideration, as there are so many equally good hill stations already immediately above the Punjaub, and the best of all

perhaps above Rohilcund and near Oude, and most conveniently situated with reference to Nepaul, *viz.* Nynsee Tal, where there is much available ground and abundance of water, and which might at very little cost, if properly provisioned, be made impregnable.

32. Little need be written regarding Mussoorie. The station may be said to extend now from near Jorapancee, that Mussoorie. is the half-way point on the Rajpore road on the east, to Clouds-end beyond the park, on the west,—a length of about 9 miles. In the lower or Jorapancee portion, there are broad rounded spurs; in the centre part opposite the Landour bazar the ridge is narrow; beyond that there is a spreading but very strong craggy hill called the Camel's Back, ending at a neck of land on which the Mussoorie bazar and library are situated. Thence the range widens, throwing out spurs to the south and north (the latter a broad one including the Waverly Hill,) from the main ridge, which ceases at Clouds-end, bastioned as it were by a hill called Benog, on the north, and Budraj on the west.

33. Every bit of ground in Mussoorie has been taken up, and almost every available site has been built on. In the centre part of the station the houses are crowded together nearly as closely as they can be.

34. The altitudes of the different points of the Mussoorie ridge have a considerable range from 500 to 1500 feet below Landour. The average may be said to be about 900 feet lower than Lall Tibah, the highest point of Landour.

35. Mussoorie is purely a civil station, or rather I should say European municipality, resorted to principally by families of the Anglo Saxon residents of the plains of the North-Western Provinces, and officers of all services on leave, including military officers not attached to the dépôt.

36. Concluding that in course of time the roads will be widened and improved, the only suggestions that can be made regarding Mussoorie is one that has been frequently made, *viz.* that the conservancy arrangements should be improved; and one of general application to hill stations, that the slopes and all but the actually precipitous hill-sides should be terraced, and made to produce food for the community, and thus cheapen supplies and render such Sanatoria less dependent on the plains.



37. The terracing of the hill-sides would with proper precautions greatly facilitate conservancy arrangements. Cleanly cultivated terraces would be far healthier than offensive irregular slopes scored with little crevices and ravines covered with unwholesome, and in the rainy season, most rank vegetation, choked with every kind of filth always, except when heavy showers spread it in every direction.

38. All the sweepings and drainings of houses and out-houses, which now litter and foul the hill-sides, if daily collected and put at once out of sight and smell, under ground in little trenches, excavated in such terraces, each deposit being at once covered with the earth taken from the trench, and left undisturbed till deodorization had resulted from amalgamation and absorption, would go to produce healthy crops which would be remunerative and far less injurious than the offensive weeds which now interfere with ventilation.

39. If it is argued that such deposits in sites are objectionable and dangerous, the answer is that they now exist in the most exposed and aggravated form, polluting the surface and generating and emitting most noxious effluvia. Such terraces would be far safer than sharp slopes : they would add greatly to the appearance of such stations, and would make them to some extent self-supporting.

40. The first step of the process has already begun in the neighbourhood of Landour and Mussoorie, where potatoes may be seen growing, even without terracing, on very sharp slopes.

41. Of course such a measure could not be enforced, but the mere suggestion would induce some proprietors, a little pressure regarding conservancy would stir up others, and eventually the profit would persuade all, to adopt it.

From J. WILKIE, Esq., M. D., Deputy Inspector General of Hospitals, to Sir G. COUPER Bart., C. B., Secretary to Government, North-Western Provinces,—  
(dated Meerut, the 29th June 1861.)

I HAVE the honor to acknowledge the receipt of your letter No. 500A, dated the 28th March, and now beg leave to mention for the information of the Hon'ble the Lieutenant Governor, with reference to the improvements and extension of sanatory establishments, that though my personal knowledge of the Hill Sanatorium of Landour has been limited, it appears to me that the best plan of extending the

accommodation there for European troops would undoubtedly be to pull down all the present very indifferent bungalows occupied by the convalescents, and only capable of lodging from 12 to 14 men each, and to construct good upper-storied barracks with all the latest improvements, on nearly the same sites. By this construction and arrangement, a much greater number of soldiers might be comfortably quartered, and the depôt likewise be concentrated, as at present it is very straggling, owing to some of the buildings being too far apart.

2. This plan would be found preferable to erecting more bungalows beyond the Landour Hospital, as that hill does not belong to Government; and in case more ground may be required in the immediate vicinity of the depôt, Longwood would be an admirable site for a large barrack. This estate is private property, and from report said to be worth about ten thousand rupees.

3. With reference to any other situation within the limits of my medical superintendence, where a Sanatorium may be established, I beg to state that Lohoo Ghat seems to be in many respects a suitable locality, and the following cursory description will give an idea of its important advantages. Lohoo Ghat is 60 miles or 4 marches to the east of Almorah, 28 miles to the south of Pctoragurh, 32 by the present circuitous route to the foot of the hill Burmdeo on the Gogra River, and thence 44 miles *via* Sumcea to Philibet Joint Magistracy of zillah Barcilly, where in future there will always be stationed an European force. The present road from the plains though much frequented, is very bad, and in consequence of this and the want of bridges, travelling is impossible during the months of July, August, September, and October. Lohoo Ghat is 5600 feet above sea-level. The present cantonment is small, and only sufficient for a Native regiment; but there stretches from the western boundary towards the north, a fine open sloping grassy plain, on which barracks for 1000 Europeans might be erected. Along the southern and western boundaries there are streams affording excellent drinking water and good bathing. A range of hills about 400 feet high encircle the station on the north and east, and a still higher range closes the view to the south. The ground gradually slopes from north to south, affording good natural drainage. Besides the rivulets already noticed there are numerous springs of unexceptionable water all over the station. The temperature during the summer

months seldom rises in a house above 80° Fahrenheit. The rainy season corresponds to that in the plains from the middle of June to the end of September, and then the average rain-fall is about 70 inches. Mists so common elsewhere in the hills are here very rare. The winters are generally severe, the snow-fall having been known to amount to 3½ feet deep, and remaining long on the ground. There is no rank vegetation about the place to give rise to miasmata productive of endemic diseases. Remittent or jungle fever is unknown, intermittents or agues are of the mildest type, and that distressing complaint diarrhoea, so frequent at other hill stations, is not prevalent. Fuel can be had in abundance from the neighbouring hills; but supplies would be required to be brought up from the plains, and which would be an easy matter to arrange, were communication by a new and shorter road made, and all the rivers and nullahs bridged.

From J. MURRAY, Esq., M. D., Deputy Inspector General of Hospitals, to Sir G. COUPER, Bart., C. B., Secretary to Government, North-Western Provinces, Nynce Tal,—(No. 86, dated Agra the 12th April 1861.)

I HAVE the honor to acknowledge the receipt of your letter No. 501A dated 28th March, forwarding a copy of letter No. 952E, from the Officiating Secretary to the Government of India, dated the 16th February 1860, regarding Sanatoria for European troops in India, and requesting I would make any suggestion that my experience may lead me to offer on the subject.

2. The position of the European troops that hold India is not a purely medical question; the situation of the cantonments *within a limited distance* being determined by strategic reasons, whilst the health of the troops is guarded by properly planned barracks, and clean well-drained lines, constructed on the least objectionable site within this limited space.

The direct action of the sun causes disease; but it is from malaria generated during the damp weather of the rainy season, that the seeds of diseases are sown, which form the chief causes of the mortality and invaliding of European troops. Experience proves that this miasma is dangerous, chiefly at night, and confined to a stratum varying from 8 to 12 feet above the surface of the ground. In all tropical climates European troops should *sleep at least this distance above*

*the ground during the rainy season.* The objection to raising the floor of the barracks to this height *on arches*, is the expense arising from waste of material, which a little additional outlay would turn to use. If the buildings were *two-storied*, raised on a 3 feet plinth, with the lower story 16 feet high, and the upper 18 feet, the expense would be little greater than building on arches. The lower story could be used for orderly, store, dining, and mess-rooms; saddlery and armourers' shops, work-shops, wash-houses, and solitary cells; and as it would be as healthy as the present barracks, it might also be occupied by the married men.

The influence of elevation above the level of the sea on the health of troops is generally in proportion to the height up to 8000 feet, but this is modified by many local circumstances which render some situations more healthy than others that are higher; for example an elevation of 1000 feet *on the sea coast*, from enjoying the cool sea breezes, will be healthier than an elevation of 2000 in the centre of a jungly country, as in the uncleared valley of the doon, which is deadly. In Central India, Goonah is 1800 feet above the level of the sea, rocky, undulating, dry, and healthy; whilst the neighbouring stations of Lullutpoor, Jhansie, and Oorai, that are only 600 feet lower, but surrounded by black spongy soil, are very subject to miasmatic disease.

The *fall of rain* materially influences the salubrity of hill stations. At Cherra Poonjee in Assam, and the Mahableschwur Hills in Bombay, the fall varies from 300 to 500 inches during the season, rendering them uninhabitable. Across the snowy range on the Thibet frontier, (where I was in 1836) there was no rain during the rainy season, the air was cold and dry, and most invigorating at an elevation of 12,000 feet.

The fall of rain in all the Sanatoria on this side of the Himalayan range, is great during the rainy season, generally upwards of 90 inches; but in addition to the rain the hills are enveloped in a dense fog, with few intervals, from the end of June to the end of September. This prevents exercise; depresses the spirits; arrests improvement, and often causes relapse of tropical disease. The cold season is bright, cold, and invigorating. Many cases which had suffered severely in the plains, and barely held their own during the hot and rainy seasons, now convalesce most satisfactorily. Even though suffering from extensive organic disease, I opened several hepatic abscesses, which recovered completely at Landour.

The mistake of many lies in expecting recovery from extensive organic disease, not only during the unfavourable season but in a shorter period than any climate could produce a cure. A residence in the hills will not cure; and it is questionable if any climate will render fit for service old worn out men suffering from organic disease of the head, heart, or kidneys, from rheumatism, scrofula, or secondary syphilis; but I have witnessed the most gratifying recoveries from the most advanced stages of the ordinary tropical diseases in *young men* during a residence of *one or two cold seasons* at Landour.

*Bowel complaints* (white watery diarrhœa,) are supposed by some to be induced by *high elevation*. These complaints are not uncommon at Simlah, sometimes appearing there for the *first time*. At Landour I met with several *relapses* of this complaint, which, when they proved fatal, were found to be connected with disease of the kidneys; but I do not recollect any case *originating* at Landour, Mussoorie, or Nynce Tal. The cause at Simlah appears to be *local*, probably arising from the water drunk, which is chiefly surface water, drained through dense vegetation, with imperfect conservancy, by people going up from the plains. During the rainy season when every pore in the skin is pouring out profuse perspiration, the change to the cool climate is very agreeable; but the sudden checking of the perspiration alters the course of the circulation, throws more blood and work on the internal organs, under which those that are debilitated by previous disease, are apt to break down. The relapse in these cases depends on temperature and moisture, and not on elevation, and is most marked in patients with disease of the kidneys and cases of abdominal congestion, caused by miasmatic fever. The only *direct influence of elevation* that I could trace, independent of temperature, (and I lived for some days on the Thibet frontier, at an elevation of 17,000 feet,) was on the *respiration and circulation*. Moderate exercise caused difficulty of *breathing* and *palpitation*: it also caused *headache* in those who previously suffered from this complaint. The inhabitants are vigorous and strong, and in number proportioned to the extent of ground under cultivation. *Goitre* was the only indigenous disease; and I saw no miasmatic disease beyond the snowy range.

There is a belt of jungle called the *Teraï*, skirting the outer range of hills, in which it is dangerous to be detained at night, during the rainy season. It varies in width from 15 to 30 miles, and may at other

seasons, and even during the *rains in the day time*, be passed without danger.

There have been numerous instances of residents in the hill stations being attacked by severe tropical or miasmatic disease, but these cases were caused by descending into the ravines or valleys in the vicinity, on shooting or fishing excursions. There the heat of the sun is as great as in the plains, and miasma at the end of the rainy season is most abundant.

The diseases to which children and habitual residents are liable, are inflammatory affections of the *chest and throat*, rheumatism and *bowel complaints*, similar to those found in Europe, with occasional relapses of the diseases from which they had suffered in the plains.

In the vicinity of Landour there are several *mineral springs*, both *sulphuretted* and *chalybeate*, which I used with great advantage in rheumatism, secondary syphilis, spleen, and hepatic cases. An hospital with baths should be built near the sulphur springs.

An elevation of 4000 feet appears sufficient to escape from tropical diseases, but a higher elevation up to 8000 is more invigorating and tends more to restore a weakened constitution.

I made enquiries regarding the health of the men who came down from the hills in May 1857 to the siege of Delhi, in comparison with that of the corps assembled from the plain stations. Brigadier Showers, c. b., reported them as *stronger and fitter for service*; but the general answer was that the subject had not attracted attention, and that there was no marked difference.

The objections to the hill stations are the limited space available for parades, exercise, and amusement, and the difficulty and expense of getting vegetables, extra articles of food, and water, and Native servants: these are important points to steady married men.

Dr. Dempster's remarks are sound and practical. I only differ from his opinion of the necessity of new cantonments being at least 5 miles from large rivers, which may be applicable to Bengal or the Upper Doab, where the rivers overflow the country for miles during the rainy season.

High or undulating, well drained sandy or rocky soil, not surrounded by flooded or marshy land, with good water and upper-storied barracks, will form a healthy cantonment. If from strategic reasons

it is necessary to have the cantonment in a low marshy country, the health of the troops would be materially benefitted by the upper story alone being used at night during the rainy season.

From J. MACKINNON, Esq., to Sir G. COUPER, Bart, c. B., Secretary to Government, North-Western Provinces,—(dated Mussoorie, the 21st May 1861.)

I HAVE attentively and repeatedly read over the Blue Book, relative to Hill Sanatoria in India, which I lately received from your Office ; and in compliance with the wish of His Honor the Lieutenant Governor, I proceed to state my views on the subject, especially of improving the Landour convalescent dépôt, with which I have been long familiarly acquainted. It may be necessary, however, to premise here, that though I have mentioned the Blue Book upon the subject, I have derived no assistance whatever from its contents. I named it merely to account for a delay in writing to you, which would not, otherwise than on account of my desire to extract if possible, something from its pages, have withheld me so long from writing my reply. The book touches on none of the points which appear to me to be essential to a perfect Hill Sanatorium.

2. It is not practicable, I fear, to make any decided improvement on the Landour dépôt as it stands now. My next advice would be to remove the Sanatorium wholly from its present site, and to replace it by entirely new barracks in a different situation, on the *northern face* of the same hill.

3. The present barracks afford the men no room for exercise inside or outside. They have not sufficient verandahs, and the ground near the buildings has dangerous declivities on three sides. The roads are excessively steep ; and owing to the buildings belonging to private persons all around, it would be almost impossible to improve or extend them.

4. Water is very distant, and consequently very costly, besides, not being always perfectly pure when brought in bags to the barracks.

5. Fuel too is very distant, and much more costly therefore than it would be in a more favorable position with respect to the forests.

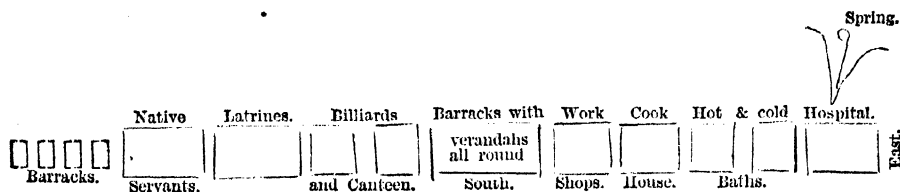
6. In making the change which I have indicated, the Government would certainly be no losers : all the present buildings would sell certainly

for their full value. Were the change made, the saving of cost at the new depôt would be very considerable.

7. I do not presume to discuss medical reasons; but from experience of the climate I disapprove of the present exposed situation of the barracks and hospital at Landour. I was head for nearly fifteen years of the largest boarding school that has ever existed in the hills; and while valuing low temperature, I saw good reason to dread sudden draughts of air, high winds, and rapid changes of temperature, as injurious to delicate constitutions. Landour is exposed to all these evils in a remarkable degree, and possesses only low temperature, of which enough could be commanded even at sites 1000 feet lower, on the northern face of the hill. An altitude on that side of from 6500 to 7000 feet, gives in this latitude perfect coolness with immunity from the rapid variations experienced on mountain-tops.

8. The Landour depôt is enveloped in foggy clouds for about 90 days at the least, every rainy season, in common with all habitations on the south face of the hill from Rajpore the whole way upwards. On the northern side to which I shall presently come, the cloudy envelope would not prevail for fifteen days altogether. I speak from actual comparison made between my own residence and the Landour depôt when I first came to the hills, and confirmed by every year's observation during the 27 years that have since elapsed.

9. The new site to which I allude lies on the northern side of the Landour Hill, partly below the Childer's Lodge estate; and thereon, after the clearing and levelling, I would suggest the building of a system of habitations in the manner shown by this diagram.



10. In this part of the Himalayas the wind blows almost steadily from the south. No habitation therefore should have a door opening to the south. Doors should open if possible to the east and west only, or to the north if absolutely necessary, but never to the south. To the



south all openings ought to be of the nature of sash windows, so as to place draughts and ventilation under proper control. No house ought to be north or south of another, unless the distance between them is considerable, at least a quarter of a mile.

11. I have marked the spring as above the level of all the houses, so that the cost of water should amount to nothing appreciable. At my brewery, where water is so largely consumed, water is almost as cheap as air; and the contrivances simple yet durable, by which this end has been attained, might easily be adapted to the *depôt* in its new situation, and with the same results.

12. I would dwell especially on the importance of there being water to use and to waste *ad libitum*, so that the consumption shall be of no account. Nothing promotes and preserves health amongst convalescents in the hills so much as the regular ablution of the entire person, at least every second day. In my school which exceeded on average, 100 boys, one-half of them was washed with luke-warm water every other day, with marked good effects. The skin of invalids who have lost health on the plains, I found always to be singularly inert in the hills, and to require constant washing and rubbing to promote its healthy action.

13. Ample sewerage service might be secured by turning the waste water into the cook house and latrines, from which sheet iron troughs might extend far enough to carry refuse to a very distant point.

14. Soldiers' gardens could be inexpensively irrigated with water from the springs also; and the aversion to gardening which the want of water so often gives rise to in the hills, would thereby be obviated.

15. A small bazar might if required, be set up west of the servants' houses; but the present most excellent bazar would from its being nearly on the level of the new site for the *depôt*, be more easily available than now, and in fact not so distant as it is at present from some of the higher barracks to which access is moreover extremely difficult.

16. No doubt there would be some expense in levelling the ground of the new site, but that is indispensable every where in these hills. The recommendation of the new site is, that it is *possible* to level the ground to the extent required; for level ground around the barracks is

necessary, to give room for good verandahs for games, and for space (to the south,) for ranging the men's beds in the sun-shine every day if possible, for three or four hours. This I found to be a most healthful practice. The bedding was dried after the perspirations of the night, and the bed rooms were most effectually aired thereby. From the experience of my school; I regard this thorough drying of the bedding and the airing of the rooms as next to regular bathing in promoting health.

17. What I have above set forth as concisely as I could, is the pith and essence of my actual experience, and is confidently offered now after a residence of twenty-seven years in these hills. That it may be seen that I have some right to speak decidedly, I may state here that by the blessing of God we lost only three (3) boys out of the large number in our charge during the fifteen years. Not one of the three died of disease contracted here. One was a little boy who came with strictures (after dysentery) that almost closed the alimentary canal; a second boy had hydrocephalus; and the third a typhoid fever caught in the doon. Neither was there any coddling of the boys. As soon as a new arrival was at all able to join the promiscuous crowd, he was sent to rough it. Cricket and other manly exercises were encouraged; those so minded cultivated gardens; others built huts for themselves in the Khuds with their own hands; and in summer, as soon as school was over (5 p. m.) all the lads that chose, ran or rolled down the hill to a copious stream which afforded pools for swimming baths, into which they plunged. Those who stood through the winter benefited amazingly by the frosty weather, and appeared to be never so well as in time of snow.

18. I have strictly confined myself to facts within my own actual experience and observation; and if in my desire to be brief I should have failed to make my meaning clear, I shall only add in conclusion that I am ready to answer any further questions that may be asked of me.

## NOTES ON CONSERVANCY.

EVERY proprietor or landholder having property within the boundary of Nynee Tal, shall cause to be constructed,—and report the same to the Secretary of the Municipal Commissioners, within 30 days after the receipt of these bye-laws,—latrines with cess-pool\* for each tenement belonging to him or her according to the accompanying plan, No. 1, for the use of the native domestics and others residing thereon, under a penalty of rupees 50, and a fine of one rupee per diem for each day after the above period that the said latrines and cess-pool remain incompletd; and should any proprietor or landholder neglect for 60 days to comply with the above rules, the Municipal Commissioners shall order the latrines, &c., to be completed by their own agent,—the cost to be charged to the said proprietor, who shall be required to keep the said latrines and cess-pool in thorough repair. Neglect to do so after due notice being given by the Secretary to the Municipal Commissioners, will be punishable under the law relating to their construction in the first instance.

2. About half a maund of quick-lime and half a maund of charcoal should be thrown into each cess-pool twice a year,—say on the 1st June and 1st September.

3. It is evident that the present latrines situated behind the bazar are most defective, and that others of a description that will admit of being kept thoroughly clean at all times and seasons, must be substituted for the convenience of strangers, travellers, and people residing in the bazar and its neighbourhood, who do not possess accommodation in their private dwellings.

4. The accompanying plan, No. 2, has been prepared from a sketch of the public latrines in use, and found to answer admirably at Agra and other places in the North-Western Provinces.

5. Accommodation marked A in the plan No. 2, has been provided for the location of sweepers on the premises, whose duty it will be to sweep after each visitor, and deposit the ordure in the reservoirs D,

\* It would be desirable to avoid having cess-pools if possible, but after a careful consideration of the whole matter, I see no other feasible way of disposing of the ordure of private houses, and I feel certain they will answer the purpose without inconvenience.

ready for removal in puckals to a proper distance, which must be done at least twice every 24 hours, viz. at day light in the morning, and at 3 o'clock P. M.

6. The place for depositing the ordure and other refuse shall be fixed by the Municipal Commissioners.

7. Every person using the public latrines, must pay the sweeper in charge one dumree for each visit, or compound with him for a monthly fee of two annas.

8. All householders in the bazar who have private conveniences and no cess-pools, must be held responsible for their sweepers depositing the ordure in the public reservoirs; and all nuisances committed by private sweepers in the performance of this work, shall be punishable under the Nuisance Act.

9. Every householder shall report to the Secretary of the Municipal Commissioners within 30 days after the publication of these bye-laws, the conservancy arrangements, if any, provided for the people residing on his or her premises, under a penalty of 30 rupees.

10. The sweepings of houses and the bazar generally, such as ashes and other refuse, shall be deposited in the Bunker E., ready for removal to a proper distance, which must be done daily.

11. Any person found committing a nuisance by relieving the calls of nature near any public or private road, or in any public place whatever, other than within the enclosure of the latrines provided for the purpose, shall be punished by a fine of 4 annas for each offence, and his lotah shall be secured and deposited in the magistrate's office as security, and if not reclaimed within 30 days, it will be sold to defray expenses, and the whole proceeds credited to the municipal funds.

12. Any householder in the bazar allowing any filth to remain within six feet of his or her premises, one hour after daylight, and between the hours of 7 A. M. and 7 P. M.,—one hour after due notice has been given by the police, shall be punished by a fine not exceeding 5 rupees for each offence.

13. A public serai shall be provided for the use of travellers, and the temporary location of horses, donkeys, bullocks, sheep, &c., &c.; and I would propose one something on the accompanying plan, No. 3, to be erected near the public latrines.

Any person using the serai shall be subject to the payment of the following fees for every 24 hours' occupation :—

For each person, 1 pysa.

For each horse, 1 adhela.

For each bullock or cow, 1 adhela.

For each sheep, goat, and other small animals, one chudam.

14. Any person found picketting horses, donkeys, bullocks, cows, sheep, &c., outside the serai in any public or private place, other than within the precincts of their own premises, shall be punished by a fine not exceeding 4 annas for each animal for the first offence, and 8 annas for each animal for every subsequent offence.

15. It appears the butchers are in the habit of keeping and slaughtering sheep, goats, &c., on their private premises, a practice which should be put a stop to at once by the establishment of public shambles in some convenient situation, and the enforcement of the following rules :—

16. Any person slaughtering bullocks, cows, sheep, goats, &c., for public sale in any other place than the public shambles, shall be punished by a fine not exceeding 5 rupees for each animal so slaughtered for the first offence, and 10 rupees for each subsequent offence.

Any person using the public shambles shall be subject to the payment of the following fees :—

These fees were subsequently increased.

For every bullock or cow slaughtered, 1 pysa, and for every sheep, goat, &c., one adhela.

17. The ordure, and all filth and refuse of the bazar, shall be carried to a proper distance by a road exclusively for the purpose, and deposited in some out-of-the-way spot to be fixed by the Municipal Commissioners; and I would recommend one of the two following places, viz., a valley on the west side of Ayar Patah beyond the upper road, about  $\frac{3}{4}$  of a mile behind Vianna House, and the other a valley in the north face of Ayar Patah, about half a mile beyond Edwinstowe. The distance to the former place is about  $1\frac{3}{4}$  miles, and the conservancy pathway must cross three public roads, whereas to the latter the distance is about  $\frac{3}{4}$  of a mile, and the pathway need not pass

very close to any public or private road. The cess-pools if placed in this locality will not interfere with any private property, and the cost of establishment will be less, I am therefore in favor of the valley beyond Edwinstowe. The chief difficulty will be the making and maintaining the road in repair.

17. I feel certain that proper conservancy arrangements cannot be carried out by Native agency, and I propose that an active steady European, who understands the keeping of accounts properly, be entertained on a salary of rupees 1,000 per annum, with a suitable residence situated near the bazar. The superintendence of the conservancy and roads would not be too much work for one man, and at the same time about as much as he could do properly; and if I may judge from the present state of the latter, they are quite as much in want of proper supervision as the former.

18. The following are defined to be nuisances within the boundary of Nynee Tal, in addition to those described in paras. 8, 12, 14, and 16, and are accordingly prohibited.

1. Furious riding on public roads.

2. Leading of horses or dogs about for exercise on public roads, except between the hours of 9 A. M. and 3 P. M.

3. Allowing dogs to be at large on the mall, and on other commonly frequented roads, between the hours of 4 A. M. and 8 P. M.

4. Driving of loose cattle on public roads, except in travelling from place to place.

5. Throwing or allowing to fall stones, earth, wood, or other rubbish upon the public roads, or laying building materials thereon, except by permission of the commissioners.

6. Quarrying stone or cutting timber, or damaging trees on public ground without the sanction of the commissioners.

7. Quarrying stone, cutting timber, burning lime, or carrying on building operations on private ground, in such a manner as shall cause danger or inconvenience to any parties, or injury to roads, trees, or property.

8. Contraventions of Rules LI & LII.

9. Making any permanent or temporary building, shed, enclosure,

awning, for any purpose, in any situation, which shall be declared by the commissioners to be objectionable.

10. Neglecting to erect or maintain proper boundary marks to a private estate.

11. Refusing to permit the commissioners to cut or trim trees or bushes within ten yards of a public road.

12. Encroachments on public roads by the exposure of articles for sale, or otherwise obstructing a public road.

13. Keeping a smith's forge, slaughter house, piggery, butcher's shop, spirit-shop, or house of ill fame, in any situation in which it shall be declared by the commissioners to be objectionable.

14. Begging on or near the public roads, or exposing sores or deformities thereon to excite charity.

15. Performing the offices of nature in any other place than such as may be appointed by the commissioners, whether on public or private ground.

16. Defiling public springs or obstructing the approaches thereto.

17. Neglect on the part of any proprietary or other occupant to keep in proper repair, and in a state of proper cleanliness, any necessary or cess-pool erected according to the provisions of Rule LIV.

18. Neglect on the part of any proprietary or other occupant within the limits of the Nynce Tal Bazars to cause all filth, sweepings, or other refuse of his premises, to be deposited daily in such places as the commissioners shall appoint.

19. Neglect on the part of any proprietary or other occupant to keep in a state of proper cleanliness any estate, compound, enclosure, or premises, by permitting the growth of rank vegetation, or the accumulation of filth, or other cause likely to be prejudicial to the public health or convenience.

20. Picketting animals on any ground other than that prescribed by the commissioners,—not being private ground occupied by the owners of such animals.

21. Slaughtering cattle or other animals for purposes of public sale, in any place other than the public shambles, or in such places as the commissioners shall appoint.

22. Washing clothes or vessels in the lake or streams, except at such places and times as the commissioners shall allow.

23. Bathing in the lake, except between the hours of 8 A. M. and 4 P. M.

24. Fishing in the lake with nets, except by special permission of the commissioners ; and infractions of Rule LVI.

Breaches of the 12 foregoing sections shall be punishable by fines not exceeding rupees 50 ; and by continuing the nuisances above specified, by fine not exceeding rupees 5, for every day such nuisance may be continued.

#### PROBABLE EXPENDITURE.

<i>Original Outlay.</i>		Rs.	As.	P.	
A moiety of Superintendent's house	...	500	0	0	
Public Latrines	...	1,150	0	0	
„ Serai	...	600	0	0	
„ Shambles	...	350	0	0	
					2,600 0 0
8 Pairs Puckals @ Rs. 5 per pair	...	40	0	0	
3 „ Buffaloes @ Rs. 20 per pair	...	60	0	0	
					100 0 0
<i>ROAD.</i>					
<i>Monthly Charges.</i>					
A moiety of Superintendent's pay at Rupees 83-5-4, say	...	42	0	0	
8 Banghies @ Rs. 4 each	...	32	0	0	
Keep of 6 Buffaloes @ Rs. 6 each	...	36	0	0	
Sundries	...	10	0	0	
					120 0 0

(Signed) S. CLARK.



From Lieutenant Colonel C. B. YOUNG, Secretary to the Government of Bengal, Public Works Department, to the Secretary to the Government of India, Military Department,—(No. 2712, dated Fort William, the 9th July 1860.)

I AM directed to acknowledge the receipt of your letter No. 874, dated the 25th June last, referring me, in reply to the question put in my No. 2213 of the 5th idem, as to whether any measures had been adopted by the Government of India for establishing a Sanatorium for European troops in the Cherra Poonjee Hills, to your previous communications, Nos. 951 and 952C, of the 16th February 1860, to the last of which it is added "no reply has been received"

2. This last letter called for information as to the extent and nature of existing Sanatoria for European troops in the Bengal Presidency, and suggested that further enquiries should be made with a view of eliciting more information on the subject.

3. With a view therefore to submitting a full and trustworthy report on the subject, the Lieutenant Governor has called upon those officers whose opinions are likely to be valuable, to institute such local enquiries as will tend to obtain the information desired.

4. The commissioner of the Bhaugulpore division (Mr. G. U. Yule) has been requested to state whether there are any Sanatoria in the hilly parts of his division, regarding which it might in his opinion, be worth while to collect data and information in furtherance of the object contemplated in your letter.

5. In like manner the commissioner of Chota Nagpore (Captain E. T. Dalton) has been directed to report particulars in regard to any places in his division which might be fitted for Sanatoria for European troops to a small or large extent.

6. With the view of converting the Khas Mehal of Rhotas into a small convalescent depot, the commissioner of the Patna division, (Mr. H. D. H. Fergusson) has been asked to make arrangements for obtaining a series of careful observations on the locality: he has been told to furnish particulars as to the means of approach to Rhotas and of improving it; the supply and quality of water obtainable; the sites that may be suited to, and the materials available for, the construction of military buildings; the nature of the soil; the general features of the country around; the direction of the prevailing winds; and such other matters as may seem to be deserving of notice.

7. Similarly the commissioner of the Assam division (Colonel F. Jenkins) has been desired to state what measures, if any, have been adopted with respect to the establishment of Sanatoria for European troops in the Cherra Poojee Hills,—and at Noormai Poonjee in particular.

8. Major Maxwell, the Superintending Engineer of the Behar Circle, has been instructed to take measures for obtaining a series of observations in regard to the temperature and rain-fall during the year at the hills near Hazareebaugh (Sectapahar) above the coffee plantation at that place: this information being submitted together with a report on the general capabilities of the hill as a dépôt for convalescents from the neighbouring cantonments. He has been further requested to obtain, if possible, a medical report upon the hill, and has been authorized to cut a foot-path giving access to the summit.

9. With advertence to that part of your letter under notice (paragraph 7,) which points to the importance of considering the geology of a district in determining some of the questions connected with the sanatory capabilities of a station, Professor Oldham, the Superintendent of Geological Surveys in India, has been asked to favor the Lieutenant Governor with any information available in his department, which may appear likely to be useful in regard to the various places mentioned in your letter, which are situated within the provinces subject to His Honor's administration.

10. As Major W. S. Sherwill has surveyed for revenue purposes, and travelled much among the Vindhya Hills, he has been desired to report whether there are any localities to his knowledge amongst those ranges which would serve the purposes of Sanatoria, or of small convalescent dépôts for European troops.

11. Lastly, the Principal Inspector General of the Medical Department has been told to take steps which may ensure a careful registration being made of the thermometric range and of the rain-fall throughout the year at the European cantonment of Dehree: he has also been requested to send a medical officer to Rhotas to submit a medical report upon it.

12. In conclusion, I am desired to state that a report showing the steps taken by the Lieutenant Governor towards facilitating the establishment of a small Sanatorium for convalescent European soldiers and

others upon Parisnath, has already been submitted to the Government of India in the Public Works Department, on the 29th ultimo. This report embodies fully the views of the Lieutenant Governor on the subject; and as a copy will be forwarded to the Military by the Public Works Department in due course, nothing more need be said at present regarding it.

13. When sufficient information in regard to the other places alluded to above has been collected, a full report will be submitted for the information of Government.

From Lieutenant Colonel C. B. YOUNG, Secretary to the Government of Bengal, Public Works Department, to the Secretary to the Government of India, Military Department,—(No. 1411, dated Fort William, the 3rd April 1861.)

IN the 8th paragraph of my letter No. 2712, dated the 9th July last, a report was promised in regard to the advisability of establishing a small Sanatorium upon the Chendwar Hill which is close to the coffee plantation at Hazareebaugh, and I am now desired to furnish that report.

2. This hill called by the Natives of the place the “Jhool Jhool Hill,” is of conical form, and has an elevation of 2815 feet above the level of the sea, and of 735 feet above Hazareebaugh. Its base is about six miles from the station, and the foot-path leading up to the summit of the hill where there is a trigonometrical station, is exactly one mile in length.

3. A series of observations in regard to the temperature and rain-fall on the hill-summit, were taken by the Executive Engineer's Department, during the months of July and August last, and the following was the result obtained:—

JULY 1860.

72  $\frac{5}{10}$  at 7 A. M.

77  $\frac{4}{10}$  at Noon.

72  $\frac{7}{8}$  at 4 P. M.

AUGUST 1860.

Mean Temperature.

70  $\frac{6}{10}$  at 7 A. M.

78  $\frac{4}{10}$  at Noon.

71  $\frac{9}{10}$  at 4 P. M.

but much reliance cannot be placed upon this table—it is stated—owing

to obvious inaccuracies which are apparent in some of the entries made by the Native observer.

4. A register, however, was also kept by Dr. Delpratt, Civil Assistant Surgeon of the station of Hazareebaugh, and he states that the average temperature in the month of August last was—

80  $\frac{7}{10}$  at 10 A. M.

80  $\frac{9}{10}$  at 4 P. M.

with a rain-fall of 18·20 inches during the same month.

5. These observations may be relied upon, and they shew that the range of temperature on the hill is about two degrees only lower than that in the plain below. Dr. Morton, Surgeon of Her Majesty's 6th Regiment, then stationed at Hazareebaugh, observes, however, that the Hill is 900 feet above the cantonments; that there is an average difference of some three or four degrees of temperature between the mean of the two localities; and that owing to the free circulation of air on the summit of the hill, the temperature there appears much cooler to the sensations.

6. Dr. Morton is of opinion that there are many cases which would be benefited by this change, and he instances specially those of fever, where the recovery is at times very slow. He is not so sure however, that dysentery cases would derive the same benefit from a change to the top of the hill; and these he adds are "unfortunately the most formidable we have to contend with." At the same time he is not prepared to say these cases would not often be improved; and on the whole, he is of opinion that it would be worth while to make the experiment of a small convalescent barrack on the hill.

7. The purity of the air on this isolated place must be considered its greatest advantage; and this, combined with the change of scene and extensive view, cannot but prove beneficial, the Lieutenant Governor thinks, to sick and weakly men. He is of opinion therefore that it is in every way desirable to go to a small expense for converting so convenient a hill locality into a Sanatorium for the European troops stationed at Hazareebaugh.

8. Under this impression, the Lieutenant-Governor caused a letter to be addressed to the Quarter Master General of the Army in October last, in which, after detailing the information that had been collected in

respect to this hill, it was stated that, if His Excellency the Commander-in-Chief thought it desirable, a small barrack capable of accommodating about sixteen men would be erected upon it.

9. The Lieutenant Governor observed that after obtaining the site, he thought it would be prudent to clear around it, and to erect a small building only at first, as there never can be absolute certainty of such a place being healthy, till actual experience has proved it to be so; but there can be no doubt from the elevation being nearly 3000 feet above the sea level, that the hill is above the general fever height, which indeed the plain itself is believed to be.

10. It was pointed out, however, that there were two objections against building at all upon the Chendwar Hill; the first was the want of water, of which there is none to be found in any part of the hill; and the second was the prevalence of thick jungle in the neighbourhood, in consequence of which, and the fear of wild beasts, the hill is not occupied even by Natives, although there is a coffee plantation with a residence for Europeans at the foot of it.

11. Clearing and levelling would easily remove the latter objection; and in respect to the former, the Lieutenant Governor remarked that an experiment might be made here,—as is done successfully in many other parts of the world,—to store rain-water on the spot, in close underground tanks.

12. On the 29th October last, the Commander-in-Chief accompanied by Colonel Becher, the Quarter Master General, ascended the hill, and this personal inspection entirely confirmed all the favorable accounts he had read in regard to the value of the Chendwar Hill as a Sanatorium for the troops located at Hazareebaugh. The disadvantages of a want of water, His Excellency observed, could effectually be remedied by constructing cisterns under or near to the barracks, which would be filled with water during the rainy season by a system of gutters conducting the rain from the roofs of the barracks into the cisterns, and this supply, His Excellency considered, would be abundantly sufficient for the requirements of the convalescents. If it were not so, rain-water might be collected in tanks hewn out of rocks in the vicinity: but Sir Hugh Rose said he had no apprehension of scarcity of water, if cisterns were made use of as in Syria and other

parts of the east, where there are no wells and where the inhabitants of large towns are solely supplied by the cistern system above described.

13. Under these circumstances the Commander-in-Chief stated that he would feel obliged if the Lieutenant Governor would order the completion of the Sanatorium, in two buildings, to accommodate fifteen men each, with the necessary out-offices, so as to place it at the disposal of the station of Hazareebaugh during the present hot season.

14. As soon as His Excellency's wishes were made known, instructions were issued to the commissioner of Chota Nagpore to take possession, by purchase, of the site of the proposed Sanatorium, or the whole of the unoccupied part of the hill which is above, and will not be required by the coffee planters; and the Public Works Officers were at the same time directed to forward plans and estimates for the works which were desired to be carried out.

15. In accordance with these instructions, the Chief Engineer forwarded on the 1st instant, estimate which provided for the following works, *viz* :—

1.	Clearance of site	...	...	Rupces	750
2.	Two barracks for fifteen men each, with out-offices	„	„	„	13,196
3.	Hill road	...	...	„	1,050
4.	Two reservoirs	...	...	„	630

Total, Company's Rupces 15,626

16. The barracks are similar in design to those at Hazareebaugh, and are intended to accommodate—

1 Officer  
1 Apothecary  
30 Men

and it has been necessary to arrange for these in two buildings, the space on the summit not admitting of the construction of one building of sufficient size to be placed in the proper direction, with reference to the prevailing wind. The whole of the available portion of the hill-top is only 230 × 160 feet in extreme dimensions, affording an area of about 30,000 superficial feet, after being levelled and cut down some twenty feet to render it suitable for building upon.

17. With reference to the very limited extent of the top of the hill, the Lieutenant Governor has, on the recommendation of the Chief Engineer, restricted work, in the first instance, to the construction of one barrack only with its necessary out-offices, which will provide accommodation for one apothecary, one non-commissioned officer, and fourteen men, at a cost not exceeding ten thousand rupees: and I am desired to express the hope that these measures will meet with the approval of His Excellency the Governor General in Council.

18. Since the above was written, a letter No. 964 of the 28th instant, has been received from the Secretary to the Government of India in the Public Works Department, in which the orders of Government are conveyed to the effect quoted in margin. The

(Extract.) The Sanatorium Barrack at Hazareebaugh ought not to be proceeded with, unless a beneficial result this year can be looked for. It is understood that this is very doubtful, and that the preparation of the site is likely to exhaust a large part of the expenditure assigned.

works alluded to above will therefore not be proceeded with, and orders have been issued to the Superintending Engineer accordingly.

From Lieutenant Colonel J. P. BEADLE, Officiating Secretary to the Government of Bengal, Public Works Department, to the Secretary to the Government of India, Military Department,—(No. 30, dated Fort William, the 4th January 1861.)

WITH reference to paragraph 5 of the letter from this office, No. 2712, dated the 9th July 1860, I am directed to forward, for submission to the Government of India, a copy of a communication from the commissioner of Chota Nagpore, together with its enclosures containing a report on three localities within his jurisdiction, which have been mentioned as probably fit for the purposes of Sanatoria for European troops.

2. The first of these localities is the Logoo Hill, respecting which it appears Captain Thompson has already reported to the Quarter Master General of the Army; the second, the Baragai Hill, it is stated does not afford sufficient space for building purposes; and with regard to the third, the Sargoojah Hill, nothing can be done at present, owing to its very remote position. No roads lead to it, and until they are made, the range is for all practical purposes perfectly useless.

4. A copy of Captain Birch's report referred to by Captain Dalton in his 9th paragraph, was forwarded to the Government of India, with letter No. 776 of 7th July 1857.

From Captain E. T. DALTON, Commissioner of Chota Nagpore, to Lieutenant Colonel C. B. YOUNG, Secretary to the Government of Bengal, Public Works Department,—(No. 473, dated the 24th April 1861.)

I HAVE the honor to acknowledge your letter No. 1039 of the 16th ultimo, calling my attention to your circular No 2210 of the 5th June last, and regret much to find that I had overlooked the requisition it contained for a report on localities suited for Sanatoria for European troops.

2. It is, I presume, unnecessary for me to make any observations on the Parisnath station, or on the Jhool Jhool Hill near Hazareebaugh, as they have been fully reported on in the Department of Public Works.

3. Under orders from His Excellency the Commander-in-Chief, Captain G. H. Thompson, Superintendent, Revenue Survey, during December last carefully examined and surveyed the Logoo Hill, twenty-five miles south-east of the station of Hazareebaugh, with the view of ascertaining its capabilities as a Sanatorium. A copy of his report submitted to the Quarter Master General of the Army, I have the honor to annex. I have not received a copy of the map that accompanied the original report.

4. The highest peak of Logoo is calculated at 3472 feet above the sea level. At an elevation of 3000 feet, there is a platform of sixty acres of level and good building ground, comparatively free from rock, and above this again, on the very summit of the hill, Captain Thompson found sufficient space for six bungalows.

5. Water is obtainable from two sources, three and a quarter of a mile from the plateau. A medical committee have analyzed it and pronounced it good; but it appears to be somewhat deficient in quantity, though it is probable that by artificial means the supply could be considerably increased.

6. Captain Thompson can only give the temperature of the air for the time he was on the hill; and no other observations have ever been made.

7. The hill is surrounded by dense jungle extending for miles, and that must render its approach unhealthy, except in the cold season.

8. The Baragai Hill on the fringe of the Chota Nagpore plateau with an elevation of 3445 feet, is more readily accessible, as it is close



to the roads between Hazareebaugh and Dorundah ; but the ridge affords no great building space. Doctor Brougham now at the Presidency spent a few days on the top of this hill with his family, and told me he thought well of it. It has since been visited by Doctor McClelland ; and I would beg to refer to either of the above gentlemen as more competent than I am at present to give an account of it.

9. From this hill to the valley of the Soane, we have a series of table lands, which attain their highest elevation in Sargoojah in two fine plateaus called the Myne Pat and the Jameera Pat. A report on both by Captain R. C. Birch was submitted to Government with my letter No. 20 of the 27th May 1857.

10. The Myne Pat is a magnificent plateau giving upwards of 200 miles of table land with an elevation estimated at 3700 feet above the sea, well watered by numerous streams. It is occupied by some sixteen villages, of a caste called Southas,\* who are by no means such wild savages as has been represented† ; but a hardy, active, healthy looking race : and during the entire year large herds of cattle from Behar and other districts are herded there, and the persons in charge of the cattle, mostly foreigners, do not appear to suffer at all from the climate. Colonel Ousely, who explored the hill, found traces of extensive cultivation, shewing that at one period it was thickly populated ; but no signs of brick or stone buildings have been discovered on it.

11. No meteorological observations appear to have been made by any of its visitors. Captain Birch was unprovided with instruments : he resided on the Myne Pat for some days in April and May ; but observes only generally, that the nights were always cool.

12. The mean temperature on the Jameera Pat during April and May is given by Captain Leigh at 81°,—maximum 94° and minimum 68°. The Myne Pat is represented as cooler, as it should be, from its greater elevation, being some hundreds of feet above the Jameera Pat.

13. There can be little doubt, I conceive, but that the Myne Pat would afford numerous sites, pleasant and salubrious, on extensive clearances being made ; but its very remote position and inaccessibility from the want of good roads, render it at present useless.

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\* Not Sonthals.

† *Vide* Journal Asiatic Society, for 1848.

14. The time may come when this drawback may be removed ;— when the Government can afford to enter again on the great work of new Imperial roads. The direct line between Calcutta and Jubbulpore through Sargoojah, is sure to command attention. The difficulties in the way of making this road are not so great as has been imagined, as will be seen from the annexed extract of a letter recently addressed by me to the president of the Military Finance Department.

15. This road would pass between the two great plateaus of Jameera Pat and Myne Pat; the latter being the more extensive and loftier of the two, I have confined my remarks chiefly to it. For an account of the Jameera Pat, I beg to refer to a report by Captain R. T. Leigh, published in the Journal of the Asiatic Society, No. 3 of 1857, page 226 to 230.

16. On the Jamcera Pat a bungalow was built for the Officer in charge of the Korundah sub-division. It was occupied off and on for two years by different officers; but was not considered healthy for Natives: the water is bad, and supplies of all kinds had to be brought from a distance.

17. It is very possible that the survey now going on may bring to light other sites in this division, but none less remote than those I have briefly reported on. In connection with the topographical survey of Sargoojah, which will be proceeded with next cold season, the information wanting in regard to the Myne Pat might be supplied.

From Captain G. H. THOMPSON, Superintendent, Revenue Survey, Chota Nagpore Division, to Colonel A. BECHER, C. B., Quarter Master General of the Army,— (No. 386, dated the 31st December 1860.)

I HAVE the honor to forward to you, for submission to His Excellency the Commander-in-Chief, the following report (accompanied by a detailed plan) on the hill range situated in this division called "Logoo;" the survey and examination of which, with a view to ascertaining the capabilities of the locality for a Sanatarium, I have lately completed, in accordance with His Excellency's desire, as verbally expressed to me at Hazareebaugh at the end of October last.

Object of the survey and report of the Logoo range.

2. The Logoo range situated twenty-fives miles south-east of the station of Hazareebaugh, and eight miles north of the Damoodah River, is one of an extensive irregularly shaped mass of hills running east and west, that skrit both sides of the Damoodah River from its source (near Toree in the Chota Nagpore District,) right down through the southern portion of the Ramghur estate and the Hazareebaugh district.

3. By the Grand Trigonometrical Survey of India, the summit of Logoo, which is at the north-west corner of the range, is in latitude  $23^{\circ} 46' 55'' 6$  north, and longitude  $85^{\circ} 43' 44'' 1$  east. Having been taken up as a *secondary* point, the elevation of the range was not-calculated by grand trigonometrical survey; but from the data for the neighbouring *principal* points that have been furnished to me by Major Thuillier, Deputy Surveyor General, and from my own observations at Logoo, on these grand trigonometrical survey principal points, I have computed the elevation of the highest point to be 3472 feet above the sea level. The extent of the range at the base is six miles long by two and a half miles broad; the top irregular surface being about five miles by one and a half miles.

4. The approach to the hill from all sides, lies through very dense jungle and broken uneven ground. The old Calcutta road, which runs through Midnapore, Bancoorah, and Hazareebaugh, and joins the present Trunk Road at Sherghotty, passes north of Logoo, at about the distance (through such a country) of a day's ordinary march. There is also an old road that leaves the present Trunk road at Rungamattee, (about six miles north-west of Parisuath,) near the two-hundredth mile-stone from Calcutta, and joins the old Calcutta road at Goomiah, which is also distant from Logoo about a day's march. These marches, however, take you to the north and east sides of the hill; and another march is necessary to get round to the village of "Morpah" at the south-west base of Logoo, from whence the ascent up the hill commences. By the old Calcutta road "Morpah" is distant from Hazareebaugh four marches over very tough ground; but this is not the proper route between the two places. There is a road over better ground in a more

southern and in a more direct line, by which the distance can easily be marched in three stages; one from Hazareebaugh to Churlee, the second from Churlee to Bussutpore, and the third from Bussutpore to Morpah.

5. As noticed in the preceding paragraph, the hill is ascended from the south-west corner or base, from the village of Morpah. From this point the ascent is gradual and easy. The present path or track runs up with very little winding, and could easily be made into a good road. The village of Morpah is about 1000 feet above the sea, consequently the rise up the hill is close upon 2500 feet. It takes about two and a half hours to walk up quietly, and about one and a quarter hours to come down. The range cannot be ascended from any point on the northern or western faces, which are both abruptly scarped. A road could be made up the eastern face, also from other parts of the southern face; and tracks to wood-cutting localities (none of which, however, are more than 500 feet up the range) already exist on the eastern and southern face.

6. From the top the range has a very different appearance to what you are led to expect on viewing it from any quarter below. The general surface of the top is broken by several ranges and valleys, as shown on the plan, all of which incline to the south and east. The northern ridge is about 400 feet higher than the southern ridge; and the eastern end of the range is not more than half as high as the western end. The fall to the east, however, is very gradual, and is little or nothing for the first three miles from the western ridge. There are several level spots (as noted on the plan) on this three miles of high land, that are suitable for building on. The plateau marked A, on the north-west corner of the range, and called "Kajooriah Berah" or date grove, of sixty acres extent, the elevation of which is 3000 feet above the sea, is in every way the best piece of building ground on the whole hill. It is remarkably level, and of all grounds on the hill, the most free from rock. The spur immediately above it to the east, on the very summit of the range, is also adapted for building purposes, and on it there is room for at least six detached bungalows, or an extensive range of officers' quarters. Both plateau and ridge are

now covered with forest, as is the whole range. The other level spots B. C. and D., varying in size from five to twelve acres each,—*vide* map ; although they might be considered as too low in elevation for barracks on a Sanatorium, are nevertheless conveniently situated for other public buildings, such as commissariat, store-houses, &c., &c.

Water supply. 7. Water is procurable from four different places on the range, as follows :—

*First*.—From the Lerwah spring, half way up the hill on the track from Morpah,—elevation about 2200 feet.

Water No. 1.

Although the present supply from this spring is small, the Natives informed me that it was never dry at any season of the year.

*Second*.—From the pokree or tank, a natural cavity, formed in a sandstone rock, by a small but constantly

Water No. 2.

flowing stream running north and south across the range. The Pokree is in the centre of the western valley of the range,—elevation about 2500 feet. The cavity is of an oval shape, sixteen feet by ten feet broad, and eight feet deep, thus containing about as much water as an ordinary well. The Natives informed me that it always remained full.

*Third*.—From the “Jogee Lutta” stream, a considerable body of running water, about a mile east of, and separated by a hill ridge from the Pokree stream just described. This, the “Jogee Lutta” stream, comes from the northern ridge, runs down

Water No. 3.

south-eastward to near the southern ridge, when it turns off to the north-east, and after running in that direction for about a mile again turns south-east and runs down nearly the whole length of the range, making its exit on the plain at the south-eastern base of the range, where it is called the “Dhurdhurwa.” The elevation of this stream at the cave of “Logoo Deota,”—*vide* map—is about 2300 feet.

*Fourth*.—From the “Puttree Pukhan” stream, running north and south in a valley about two miles to the east of the Jogee Lutta source: the Puttree Pukhan

Water No. 4.

stream into the Jogee Lutta near the southern ridge of the range. The elevation of this stream at the centre of the range is about 2400 feet.

8. The first two of these spots, where water is procurable, are distant three-fourths of a mile from the plateau A. By made roads the water could be brought up to plateau A in fifteen minutes, by ponies with pukhalls. Plateau B, C, and D, are all near water. The supply of water from the

Distance of water from level ground, and facilities for decreasing the same.

Lerwah spring and from the Pokree would be ample for the drinking and cooking purposes of 200 men stationed on plateau A. The supply from these two places only, would not be sufficient for bathing and washing purposes; but a large masonry reservoir, which would fill during rain, could easily be built in a suitable position on or near the plateau. Plateaus C and D would have an inexhaustible supply of water at all seasons from the Jogee Lutta stream.

9. The quality of all these waters have been approved by a committee of medical officers, which the officer commanding at Hazareebaugh was good enough, at my request, to order to assemble for the purpose of analyzing and reporting on them. Copy of the medical committee's report is annexed to this report.

Quality of the water approved of by a medical committee.

10. The temperature of the air, as it always is on all salubrious elevated lands, was more even and regular throughout the day and night (the nights and mornings being dryer and warmer, and the days cooler) than the temperature of the plains below.

Mean temperature of the air on top, for morning, noon, sunset, and night of five days.

For the five days and nights (from the 10th to 15th December) that I was on the top of the Logoo, the mean readings of the thermometer under a small Shouldaree tent, pitched in the sun, stood as follows: sunrise 52°—noon 67°—sunset 59°—8 P. M. 53°.

11. The rock formation on the hill is very remarkable: it is very much contorted and shattered, and at every turn most curious traces are apparent of the severe volcanic disturbance that has taken place. The rock is chiefly sandstone and quartz: the whole range abounds in huge sandstone caves. That of Logoo Deota, alluded to in paragraph 7 and shown on the plan, (at the foot of a ridge just over the Jogee Lutta stream) is a most extraordinary wild looking

Rock formation.

Logoo Deota cave.

place, and is appropriately called the residence of the imaginary god "Logoo." It measures forty paces in length by eighteen broad, and is about fifteen feet high in the centre, with entrances at three sides, that two or three men together can easily walk through. The rock over head is about thirty feet thick, and there is a huge rent in the centre.

12. Generally speaking the whole range is covered with shattered sandstone and quartz rock, which is pierced every here and there by granite peaks or columns, some of which have a very bold and imposing appearance. There being but little soil, there is not much underwood or jungle, nevertheless the forest is very extensive, and at many places very beautiful. The trees are mostly "Sukwa" and "Asun;" but there are few species of Indian trees that are not represented on Logoo. The Sukwa and Asun grow to great heights, and are far more numerous than will ever be required for any amount of building on Logoo or in its vicinity. The Natives have never hitherto cut any of the large trees from the top or near the top of the range, as they have no means of getting the wood down the hill. Trees in great numbers are constantly being cut all round the base of the hill, and for about 500 feet up the south and east faces. They are now chiefly taken to Burdwan by rafts down the Damooda, where railway sleepers from Logoo sell for rupees two each. When the station of Hazareebaugh was being built Logoo supplied a great quantity of wood.

13. With the exception of the cave of Logoo Deota, and which would not in any way interfere with the purposes for which Government would occupy the range, there is no part of the hill or range that is considered by the Natives to be sacred. Even the cave itself is very seldom visited, only once or twice a year, as far as I could ascertain, in the months of April or May, when the tribes in possession of the villages below have their annual hunts, before starting on which they make their offering to the god Logoo. If successful in the chase, they again

Sandstone, quartz, and granite.

Little or no soil, and scarcity of jungle vegetation.

Extensive forest of Asun and Sukwa trees.

Present use made of the wood.

Freedom of the range from temples or other places of Native worship.

Mode of worshipping the god Logoo.

perform worship, and in this case they offer up a little of the blood of the

Tribes in possession of the villages at the foot of the range.

The Logoo hill in whose possession.

animal killed, or some of the spirits with which they have their jolification. The tribes in possession of the surrounding villages are "Sonthals" "Bhoonahs," "Bhogtahs" and "Ghatwals," all of "Bhoodist" origin, none of whom reside

on Logoo. The range is situated in an estate of thirty villages held in jagheer from the Maharaj of Ramghur by Thakoors "Radhanath Deo" and "Gunput Deo;" the former of "Sarun," whose villages adjoin the southern face; and the latter of "Hesir," whose villages touch on the northern face.

14. As may be concluded from what has already been written, the

Derivation of name Logoo.

range derives its name from the deota or god Logoo of the tribes named in the foregoing paragraph.

15. Of wild animals on the range I saw unmistakeable signs of

Wild animals or game on Logoo or surrounding jungle.

the following:—sambur, deer, pig, porcupine, ape, monkey, hyena, wolf, and leopard.

There are very few birds: I saw only a few parrots and a couple of double spur pointed partridges. The Natives informed me that most of the large game left the hills for the plains during the cold season, and this I believe to be the case, as I had a grand hunt the last day I was on the hill, and saw nothing, although I had no difficulty in driving out a couple of bears (and shooting one of them) two days afterwards at the foot the range.

16. The only drawback to the locality for a Sanatarium that I can

Favorable opinion of the site for a Sanatarium.

see, consists in the density and extent of the jungle on the surrounding country. The site itself is a noble one, and the air on top is un-

doubtedly fresh and pure, and such I should think as is calculated to speedily renovate the impaired health of invalids from the plains of Bengal or Behar. The Natives informed me that they were seldom troubled with sickness of any kind; and if proper precautions were taken, as doubtless they would be, to prevent invalids being sent either to or from Logoo, during or immediately after the rains, the bad effects of the surrounding jungle might be little felt. There should be no difficulty about supplies for 200 men; as, although the neighbouring jungle is gener-



ally speaking very dense, it is nevertheless inhabited, and every patch of good low ground has been cleared and is now under cultivation. The valley of the "Bocaroh" nullah which runs close to and north of Logoo is richly cultivated for a limited breadth. The valley of the Damooda is also fairly cultivated, and cattle and fowls abound all over the Ramghur estate. The present inconvenience in the distance of water from the best plateau of level ground can be easily remedied by the construction of roads and reservoirs, so that on the whole I think I am safe in recommending Logoo as a suitable site for a Sanatorium or convalescent depôt for 200 men.

17. In conclusion, I may also state, that from conversation I have had on the subject with the Maharajah of Ramghur, and with the Jagheerdars of "Sarun" and "Hosir," they all appear well pleased at the idea of a Sanatorium being formed on the range.

Proprietor and tenants  
pleased at the suggestion.

HAZAREEBAUGH, DEC. 22ND 1860.

*Proceedings of a Committee of Medical Officers, held by order of Lieutenant Colonel the Hon'ble A. CHICHESTER, Commanding the District, to analyze and report upon certain waters to be submitted to it by Captain THOMPSON, Superintendent of Revenue Survey.*

PRESIDENT.

STAFF-SURGEON CLARKE, *Her Majesty's 77th Regiment.*

MEMBERS.

ASSISTANT-SURGEON HUMFRY, *77th Regiment.*

ASSISTANT-SURGEON RAMSAY, *37th Regiment.*

No. 1.—The committee having assembled and examined water in a bottle No. 1, from Lerwa spring, reports as follows:—This water is clear and sparkling; free from odour; hard but agreeable to the taste. Specific gravity 1002. On adding a solution of nitrate of silver, a scarcely perceptible precipitate was formed: on adding sulphate of barium, sulphuretted hydrogen was evolved, and the water was darkened in color, indicating the presence of lead: on adding oxalate of ammonia, a very inconsiderable precipitate of lime was observable: on adding ferriocyanide of potassium, no change took place.

OPINION No. 1.—The committee consider this water very good and suitable for the use of troops.

No. 2.—The committee next examined water in a bottle marked No. 2, from the Pokree or rock cavity in the Hill Logoo. This water is clear, sparkling, soft, and slightly bitter to the taste, (this latter quality is probably referable to the water having passed over some bitter vegetation, &c.) Specific gravity 1001. On adding nitrate of silver no change took place, which indicated the absence of organic matter: on adding sulphate of barium, sulphuretted hydrogen was evolved, which indicated the presence of lead: on adding oxalate of ammonia, no change took place, which indicated the absence of lime: on adding feriocyanide of potassium no change took place, which indicated the absence of iron.

OPINION No. 2.—The committee consider this water very good, wholesome, and suitable for the use of troops.

No. 3.—The committee next examined water in a bottle No. 3, from the Jogee Lutta stream.

This water is clear, "soft," and agreeable to the taste. Specific gravity 1002. The addition of nitrate of silver produced no change—sulphate of barium produced no change—oxalate of ammonia produced no change—nitrate of silver produced no change—feriocyanide of potassium produced no change.

OPINION No. 3.—The Committee consider this very good, wholesome, and pure water, and in every way suitable for troops.

No. 4.—The Committee next examined water in a bottle No. 4, from the Puttree Pukhan stream.

This water is clear, soft, and agreeable to the taste. Specific gravity 1001. The addition of nitrate of silver produced no change—sulphate of barium produced no change—oxalate of Ammonia produced no change—feriocyanide of potassium produced no change.

OPINION No. 4.—The Committee consider this water very good, wholesome, and pure, and in every way suitable for troops.

The Committee are doubtful about the existence of lead; but if any of the above waters contain it, it is in so small a quantity that the Committee do not hesitate to say that it could not be injurious, and

that all of them (the four waters) are good, wholesome, and suitable for the use of troops.

*Extract from a letter from the Commissioner of Chota Nagpore to the President of the Military Finance Department,—(No. 398, dated the 10th April 1861.)*

*Para. 10.*—BETWEEN Korea and Sargoojah and the districts lying to their north—Rewah, Singrowlee, Palamow, road-making would be enormously expensive, owing to the numerous difficult ghats upon each line; but I have ascertained that from a central position in Sargoojah to the Jubbulpore district, a line could be selected almost level throughout, and not presenting a single difficulty to road-making.

11. It would appear from the maps published, which include these tracts, that to make a road from Sargoojah to Jubbulpore would be a very serious undertaking; but I can state from what I have seen, that the mapping of this part of the country is at present nearly all fancy work. Sargoojah is a country of different levels, and shortly after entering it from Chota Nagpore, you descend at a place called Sirnadeeh, to what must be pretty near the level of the Jubbulpore district. From this point you can find a level line of country to Jhilmillee in Sargoojah, which passes over the Sargoojah coal fields. Further west, from Jhilmillee to Patna, which is in Korea—an undulating but easy country—and for the next march in the same direction, there is not a break in the almost even level, till you sight the halting place, Khurwat, where there is a gentle descent to a lower level of country.

12. From this point my work took me north, up steep ghats; but after careful and minute enquiry I am satisfied that the road may be carried on at the same level due west from Khurwat to Sohagpore, skirting the ridge which I ascended, and further on touching a southern range of hills,—and as far as the eye could see from the heights, so it appeared.

13. Now, it is well worthy of consideration that a direct line of road between the Sirnadeeh,\* above mentioned, which I consider to be in about longitude  $83^{\circ} 40'$  and latitude  $23^{\circ} 12'$ , and Jubbulpore, if continued east from Sirnadeeh, would prove to be the most direct line of road between *Calcutta and Jubbulpore*; and if we take the railway terminus at Raneegunge as the point of departure from an existing line,

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\* It is wrongly placed on the map.

the road from Ranecgunge to Ranchec, or a contemplated road from the new railway terminus on the Burrakur, twenty-eight miles west of Ranecgunge to Ranchec, would naturally fall into the line we are contemplating for a more direct communication between Calcutta and Central India.

14. In fact, the only difficulty is to take the road on to the table land of Chota Nagpore, 2,000 feet above the level of the sea, thence to the table land of Sargoojah which is about the same height, and then to descend about 800 or 1,000 feet near Sirnadech.

15. If this road were opened, the coal and iron as well as the timber resources of Sargoojah would be available, especially for Central India : until it be opened nothing can be made of them.

From Major General A. BECHER, C. B., Quarter Master General of the Army, to the Secretary to the Government of India, Military Department, --(No. 1288C, dated Head Quarters, Calcutta, the 3rd August 1861.)

IN forwarding the accompanying letter No. 174, dated 23rd ultimo, from the Major General commanding the Peshawur division, relative to the erection at Cheerat of two half-company barracks as a Sanatorium for the troops in the Peshawur valley, I am desired to request the goodness of your bringing the same to the notice of Government with his Excellency the Commander-in-Chief's most earnest support for the establishment of this admirable Sanatorium. His Excellency begs to draw the attention of Government to the most important fact, that the fatal period at the station of Peshawur is after the rains; and the Commander-in-Chief is of opinion, that it would be invaluable to have a good Sanatorium within 28 miles of Peshawur, whence patients might be removed by one night's dāk, whereas the present nearest Sanatorium, --Murree, is at a distance of six nights' dāk.

Cheerat has from time to time been carefully examined by all the local authorities, civil and military, and all concurred in the great advantages of the measure proposed; and Sir Hugh Rose trusts that authority may be given for trying the site experimentally, as suggested by Sir Sydney Cotton in the accompanying.

From Major General Sir SYDNEY COTTON, K. C. B., Commanding Peshawur Division, to the Quarter Master General of the Army,—(No. 174, dated Murree, the 23rd June 1861.)

THE receipt of the correspondence on the subject of Sanatoria generally, in which it is especially recommended “ that the hill Sanatorium at Cheerat ought not to be lost sight of,” with the perusal of Sir C. Wood’s minute of the 16th April, No. 15 of 1861, induce me to urge upon the consideration of His Excellency the Commander-in-Chief, the inestimable benefit which an establishment on the summit of the Khuttuck mountains at Cheerat would be to the British soldiery in the Peshawur valley.

2. Since May 1856, when this position was first brought to my notice by the civil authorities at Kohat, I have frequently brought the subject forward for the consideration of the supreme and local Governments; and the more I become acquainted with it, the firmer am I convinced of the advantages that would accrue from the establishment of the Cheerat Sanatorium. I have on former occasions fully acquainted you with the position and apparent advantages of the proposed locality. I need not here reiterate them; suffice it for me to again draw attention to a measure which would afford immediate relief to the soldier emaciated from sickness, and debilitated from the effects of the Peshawur fever. I would now respectfully suggest to His Excellency the Commander-in-Chief the construction on the Cheerat Hill of two half-company barracks, such as those which now exist at Kamilpore, sufficient for 50 men each; one of which might be used as an hospital, while the other will afford the requisite accommodation for the probable number of invalids. In addition to this party, I would propose to locate a company of Native Infantry on the hill, to hold the two towers, which as formerly suggested would be necessary for the defence of the position, while two more companies remained at the foot of the hill in support, at Silli Khana or Suparee.

3. It must be clearly understood that I propose this measure not with the view in any way of interfering with the general Sanatorium at Murree, the object of which is entirely separate, and to which the men as at present would still proceed; but Cheerat from being within a night’s dāk of Peshawur, would offer immediate relief to

sufferers to whom a trip to Murree of 6 nights, with the difficulty in crossing the Indus and other streams, might be almost certain death.

4. The wholesome effects of change in cases of the fever peculiar to Peshawur, were so greatly appreciated by the medical profession, as induced Government on their representation to erect buildings of a description similar to what I now advocate at Nowshera, on the immediate bank of the Cabul river, but which were eventually carried away by the flood of 1858 ; and I do now but solicit, that structures of a similar description may be erected on the Cheerat range.

5. The first step that I consider necessary in the occupation of this position, is to secure at once an ample supply of water : there are as you are already aware, three different springs within a reasonable distance, from which a supply is procurable. But in all hill stations it has been found that great inconvenience has resulted from the want of timely consideration on this point ; and I would therefore suggest as the proper season approaches, *i. e.*, the rains, which prevail in January, that several tanks be prepared to secure an ample supply next hot season, which, along with the improvement of the approaches to the place, might be done by the Sappers after they can no longer be kept at work on the Huzara road.

6. Having respectfully submitted the subject for the consideration of the Commander-in-Chief, I trust that His Excellency may be pleased to move the Government to adopt a measure which I earnestly believe to be of the most vital importance for the welfare of the troops located on the frontier.

From Major R. C. LAWRENCE, C. B., Secretary to Government, Punjab, Military Department, to the Secretary to the Government of India Military Department, —(No. 412, dated Lahore, the 9th November 1861.)

I AM directed by the Hon'ble the Lieutenant Governor to acknowledge the receipt of your letter No. 1121, dated 27th of August last, with enclosures, having reference to the establishment of a Sanatorium at Cheerat, for the benefit of the troops cantoned in the Peshawur valley.

2. I am to remark that this proposal was agitated in 1855, and again in 1856 by the local authorities, civil and military, who were at that time unanimous in recommending the scheme. It was however

objected to by Sir John Lawrence, and negatived by the late Governor General.

3. Sir John Lawrence's reasons for objecting to the measure are fully expressed in his letters.

4. At the time Sir John Lawrence had not seen the site in question, but towards the close of 1858 he visited the spot, and was confirmed in his opinion of its being unsuitable for the permanent location of European troops.

5. The civil authorities too, namely Colonel Sir H. Edwardes and Major James, who in 1856 were in favor of the project, after visiting the hill in 1858 changed their opinions, and coincided in those expressed by Sir John Lawrence.

6. His Honor the Lieutenant Governor considers that for the most part the objections to the formation of a settlement in the Khuttuck hills, which were urged by his predecessor, still exist: but it is mainly on political grounds that Sir Robert Montgomery is himself opposed to the measure.

7. In His Honor's opinion the position is in too near proximity to Afreedee villages, the nearest being but 12 miles distant from Cheerat, and on the same range.

8. It is quite true, the Lieutenant Governor observes, that since the proposal to occupy the hill was first made, our relations with the tribes are much improved; and that their own interests prevent those open acts of hostility which were once so frequent; still their natures are not changed, and we may any day have a rupture with them, and on the occasion of such an event, our position at Cheerat would be exposed to insult and annoyance.

9. The commissioner of Peshawur, whom the Lieutenant Governor has consulted, and a copy of whose letter is forwarded, considers that Cheerat is in too near proximity to Afreedee villages to render it a desirable location for European convalescents, or a safe one for invalid officers, women, and children.

10. This opinion is in accordance with the views of the Lieutenant Governor. His Honor apprehends that to commence building in the Khuttuck hills, would be the signal for a general interruption of the good understanding which at present exists with the neighbouring tribes.

11. Already an uneasy feeling is said to prevail amongst the Afreedees, in consequence of a rumour having got abroad that barracks are to be built at Cheerat: this has been intimated by the Commissioner of Peshawur since this letter was drafted.

12. Therefore, although the advantages which would accrue to the troops at Peshawur from the formation of a Sanatarium in their immediate neighbourhood, are fully recognized by the Lieutenant Governor, His Honor considers that the time has not yet arrived when it would be advisable or prudent to establish one in any of the hills which surround the valley.

13. But though the Lieutenant Governor is of opinion that no buildings should be erected at Cheerat, His Honor sees no objection in ordinary times to the hill being made available for encamping a detachment, as has been done during the last two months.

14. In this manner Cheerat could annually be made available for the speedy relief of soldiers suffering from the Autumnal fever usually prevalent at Peshawur; whilst the Murree Sanatarium might if necessary be extended, in view to a greater number of invalids being accommodated there from the commencement of the season than heretofore.

15. The Lieutenant Governor understands that the Trunk Road between Peshawur and Hussun Abdul will be metalled within the next 8 months. From the latter place the road to Rawul Pindee is good, and from thence it is only 40 miles, chiefly through the hills to Murree; and a road is being completed, which will admit of carts going within 12 miles of the Sanatarium.

16. His Honor observes that by organizing a good bullock train establishment, invalids might be moved from Peshawur to Rawul Pindee in two nights, stopping half way at Attock: there would then be but 40 miles to the Sanatarium, 28 of which could be accomplished in the bullock train carts.

17. With such facilities for reaching Murree, and with such healthy stations as Rawul Pindee and Kamilpore in close proximity to Peshawur, and with permission also to occupy Cheerat during the Autumn, the Lieutenant Governor trusts that his objections to the permanent occupation of the latter hill, will not be of any real detriment to the troops.



From R. TEMPLE, Esq., Secretary to Chief Commissioner, Punjab, to the Secretary to the Government of India, Foreign Department,—(No. 720, dated Lahore, the 28th September 1855.)

I AM directed by the Chief Commissioner to submit, for the information of the Hon'ble the President in Council, copy of a correspondence regarding the establishment of a Sanatarium in the range of hills which separate Peshawur from the Kohat district.

2. It will be observed that Brigadier General S. Cotton who commands the Peshawur division, the commissioner of Peshawur, and other local officers, appear to be unanimous in favor of the proposed measure.

3. The Chief Commissioner has never visited the actual site in question, but he has some acquaintance with the locality, having been on several occasions in its immediate vicinity, and has had many opportunities of forming a judgment of the character of the tribes who inhabit the adjacent country. And I am now to make the following remarks on the subject of the proposed Sanatarium, which is a matter of much importance.

4. While admitting that a Sanatarium within 30 miles of Peshawur would prove highly beneficial to the force stationed in that valley, the Chief Commissioner is inclined to think; 1stly, that it would be at present premature to attempt forming such a Sanatarium in any of the hills which surround that valley, 2ndly, that a Sanatarium is not absolutely necessary, and 3rdly, that the proposed position on the Shear Kullian range is not so eligible as at first sight may be imagined.

5. In reference to the first point, the supreme government are well aware of the present state of the Department of Public Works in the Punjab, and of the demands for these territories, as regards internal improvement. Though so much has been performed during the past five years, there is still more required. A new system has been lately introduced, and the Department of Public Works may be considered to be, to a certain extent, in a transition state. The funds which have been allotted for the Punjab will require to be carefully husbanded and frugally administered, in order to suffice for the emergent works now required. These will, on the most moderate calculation, occupy the next 3 years. There are also still many important works on which little progress has been effected, or on which a large outlay before completion will become necessary. In the former category are the

high road which intersects the Jullundur Doab from the Sutlej opposite Ferozepore to Lahore,—the new Sanatorium of Dalhousie, and other works : in the latter category, the Barea Doab canal, the Grand Trunk Road from Kurnaul to the Sutlej, the Peshawur road, the road and Sanatorium of Murree, and the large military cantonments generally. In particular, General Cotton himself has complained of the slow progress with which the military buildings of Peshawur have been carried on. If then a new Sanatorium is to be authorized for the Peshawur valley, more engineer officers and additional funds will be necessary, or some of the works now in hand must be set aside for this purpose. The Chief Commissioner himself believes that many new works might be enumerated of more importance to the development of the resources of the country, and the general benefit of the people, were the means at our disposal enlarged. It does not therefore appear expedient to increase the number of our Sanatoria, unless urgently necessary, as they must inevitably absorb a large expenditure, while their benefit is confined merely to the European community.

6. Again the road from Peshawur to Kohat, *via* the Shear Kul-lan range, has as yet not been thoroughly surveyed, and no estimates have been prepared. If the immediate construction of this be ordered, the engineers must be allowed to work at their own discretion, and virtually without control, on this line, or else considerable delay must occur before the report and estimate will be ready. It seems to the Chief Commissioner doubtful, whether Government would eventually deem this line of sufficient importance to justify an expensive road. But if a Sanatorium be sanctioned, such a road will then be necessary.

7. The Chief Commissioner is further disposed to doubt the expediency on general, military, and political grounds of having a Sanatorium at present in the Peshawur valley. It is well known how much difficulty has been experienced in protecting the cantonment of Peshawur from nightly depredation, though garrisoned by some 10,000 soldiers. Government have lately found it necessary to authorize the erection of a wall encircling this cantonment, for its security. At this very time the Chief Commissioner has before him a reference from His Excellency the Commander-in-Chief, regarding a proposition by Brigadier General S. Cotton to guard the Peshawur cantonment by military Police at a large cost. These circumstances are mentioned to show the

difficulty of protecting our cantonments on the right bank of the Indus, and the caution necessary before deciding such questions as the present in the affirmative. In a word it might prove exceedingly troublesome to guard the Sanatorium itself and the approaches to it.

8 Secondly, as regards the necessity for such a Sanatorium in the valley of Peshawur, the Chief Commissioner would observe that Murree is no more than 150 miles from Peshawur, and 125 from Nowshera,—the two cantonments for European soldiers in the valley. Of this distance full 30 miles is within the hills. In respect to the European soldiery, the force is so large at Peshawur that all the invalid or even weakly men might early in the year be selected and sent off to Murree. The presence indeed of such men cannot be useful in the plains, under any circumstances, during the hot months. To the State, therefore, it can be of no importance whether such soldiery be at Murree, 150 miles off, or at Shear Kullian within 30 of their cantonments; while to the men themselves, provided they are sent away sufficiently early in the season, the distance is of no moment. Indeed, during the cool months, the march would rather than otherwise prove salubrious. It is quite true that the extent of that portion of the Murree cantonment devoted to the soldiers' barracks is somewhat limited, but this can be readily remedied at a small cost by purchasing up three or four sites at present, and occupied by private individuals. The barracks now built or in course of building, can accommodate two hundred men, including 20 families, (that number is now actually at the place;) and by the above arrangement, buildings for double the number, perhaps for more, could be erected. There therefore remains only to provide for the soldiers who fall sick during the hot weather, and those would not be many, if due care were taken in sending away the weakly men in the first instance, and in not over-drilling the others during the inclement weather.

9. At Nowshera, moreover, which has hitherto proved a salubrious climate, one of the 3 regiments of Infantry will be stationed; and a barrack for the reception of sick men from the two corps at Peshawur has been provided. Further, when the road from Peshawur to Rawul Pindie is completed, which will be the case within the next year, an arrangement might be made for transporting sickly men from Peshawur to Rawul Pindie by horse post in three nights. The latter station, it is well known, is one of the most salubrious places perhaps in the world

for European troops; but in any case, another night would enable invalids to be conveyed up to Murree. Indeed, Murree itself on the whole is not much farther from Peshawur than most of our great military stations are from other sanatoria. Thus Ferozepore, Meerut, Jullundur, and Sealkote are certainly not less than 100 miles from the nearest invalid depôts, *viz.*, Dalhousie, Dhurmsala, Landour, &c.

10. The Chief Commissioner further believes that the climate of Peshawur is not insalubrious for adult Europeans: during 8 months of the year the temperature within doors is never excessive. There are but 4 unhealthy months in the year, and of these, during two, *viz.*, September and October, the weather is usually cool. The soldiers who mainly suffer from the climate, are those of the Native Infantry, mostly Hindoos from Oude. These men are extremely penurious in their habits, neither living generously nor clothing themselves sufficiently. Her Majesty's 75th Regiment has certainly had many sick since it arrived at Peshawur; but the general opinion was that the corps arrived there in a sickly state, and that the men were much drilled during the hot season. This Regiment, the Chief Commissioner understands, had suffered from cholera both at Umballah, Cawnpore and elsewhere.

11. Lastly, the Chief Commissioner cannot think that the proposed site on the Shear Kullian range is an eligible one. Even its advocates admit that it will be necessary to fortify the position; but a fortified post is not a convenient nor a pleasant situation for sickly men. The buildings suited to such circumstances to be at all commodious, would cost a very large sum. The men would not be able to ramble about the hills with safety. The water is said to be only 400 yards from the ground, and that a tunnel can be made through it. But this will assuredly prove very expensive; and the Chief Commissioner is not satisfied that an astute enemy might not even then intercept the communications with the reservoirs. It would prove a very inconvenient arrangement to shut up Goorkhas in such a cantonment. This race usually have their families with them, and are notoriously dirty in their habits. The Goorkha Regiments are also few in numbers, and usually reserved for particular localities. They are among our best, if not the best Light Infantry in the Company's service. A fortified cantonment is hardly the place for such troops. The nearest Afrcedee village is said not to be within 12 miles of the position; but this distance is a mere trifle to such men, when

excited by a feeling of revenge or a desire for plunder. We have alarmed these Afreedee clans, but have never thoroughly punished them, much less subdued them. We may at any time have a feud with the Jamki Afreedees, whose villages flank the line of approach from Peshawur to the Shear Kullan pass. Up to the end of 1852 the road between Attock and Peshawur—much more remote from the Lencki Afreedees than the route to the Shear Kullan range—was infested by these people, though covered from end to end with posts. The road from Peshawur to the Sanatorium would be still more difficult to protect. The Afreedees, unless they could surprize a place, such as Shear Kullan should be, would doubtless not besiege or assault it, but they would hem it in on all sides, cut off its communications, prevent supplies from reaching it, and destroy stragglers.

12. The state of confusion and alarm which ensued in September 1852 at Murree, and even at Peshawur, is an example of how easily a panic may be created. Peshawur indeed was inaccessible by an insurrectionary force, but Murree was certainly at the mercy of an active enemy. At this moment the cantonment extends over a length of 2 miles, and the Goorkha detachment which is intended to guard it, has been deliberately placed by the highest military authority full three miles from the centre of the station. It may be urged that all this would be provided for at Shear Kullan; but with security, precaution is too generally abandoned, cogent reasons are given for a change of policy, and people gradually will obtain sanction to build at a distance from the fortified post.

13. The Chief Commissioner believes that it would be a very great mistake to suppose that the presence of our cantonments is generally popular with the country people. No doubt the poorer classes who find employment on the roads and on the works, are so far pleased, but the higher and more influential classes have not the same reason for satisfaction. Moreover, on the right bank of the Indus, the very men who work for us by day are ready to rob and murder at night. The Khuttucks have shown themselves a not unloyal clan hitherto; but though perhaps the best of the Pathan races, they are well known to be fond of other men's property, and reckless of life. The existence of a large market is no doubt a considerable benefit to the agriculturists and traders of the vicinity, but what have the Afreedees or Khuttucks to sell beyond fire-wood? Their hills are rocky and sterile beyond all concep-

tion, and they have literally not sufficient food to support themselves, much less to supply a Sanatorium. The bulk, if not the whole, of the supplies for such a place, would have to be brought from the city of Peshawur and its surrounding villages.

14. Again, it seems to the Chief Commissioner that the elevation of Shear Kullan, though doubtless a great improvement on Peshawur, is too low for a Sanatorium. General Cotton has always been averse to high altitudes, but the majority of thinking men do not concur with him. Hereafter the time may come when we can with safety and comfort have a Sanatorium on the right bank of the Indus. In that case it should be on the top of the great Mahaban mountain east of Eusafzei.

15. For the reasons above set forth, the Chief Commissioner, with due deference to the opinion of the military authorities, would deprecate the present proposal.

From R. TEMPLE, Esq., Secretary to Chief Commissioner, Punjab, to Colonel R. J. H. BIRCH, C. B., Secretary to the Government of India, Military Department,—(No. 1491, dated Lahore, the 11th July 1856.)

I AM directed by the Chief Commissioner to acknowledge the receipt of your letter No. 603 of the 20th ultimo, with its enclosure, calling for his opinion on a proposal to establish a temporary Sanatorium in the vicinity of Cheerat pass, and to make the following observations.

2. It is with much regret that the Chief Commissioner feels himself compelled to dissent from the views of the military authorities on this important subject; but he believes that many of the Chief objections which exist to a permanent Sanatorium in the Khuttuck hills, apply with additional force to a temporary arrangement, inasmuch as time would not admit in the latter case of proper measures being adopted for the accommodation and security of the troops. If 400 sickly men were sent up, at least 600 more soldiers would be required for their protection. To these numbers must be added perhaps a couple of thousand camp followers. The Afreedees might be in a good humour, and might not take the opportunity of molesting these people, but the chances are that they would do so. The constant communication which the supplying of so many people with food, would entail, would probably prove an irresistible temptation for plunder.

3. But of the distance of 28 miles from Peshawur to the proposed site on the Cheerat pass, some eighteen would be through a rugged, difficult, and dangerous tract, easily accessible only to horse-men mounted on animals well accustomed to such a country. This line is in every direction intersected by ravines, often nearly perpendicular, which run down from the Afreedee hills. Such ravines afford great facilities for marauders. To protect such a road permanently would require a little Army.

4. The extreme height of the broken little land above the pass cannot be more than 3000 feet above the valley ; and though doubtless removed beyond all miasma, would prove very uncomfortable in the month of September to sickly men in tents. Suparee, the spot to which General Reid alludes in paragraph 4 of his letter, is not much more than 1000 feet above the valley, and has been described to the Chief Commissioner as a position where it would not be safe to locate a small body of troops. Such a spot, though doubtless very pleasant and delightful to the eye of a Pathan, would prove neither cool nor agreeable to Europeans.

5. Furthermore the Chief Commissioner would point out that it would by no means be an easy matter to run up a loose stone wall round a camp of some three thousand soldiers and camp followers. The soldiers, even if willing to work, would assuredly suffer from the fierce rays of the Autumn sun. Even in the month of October, the heat among these rocky hills in the open air is very severe, and labourers in any numbers are not to be obtained even at a large outlay.

6. The Chief Commissioner begs to suggest that instead of this plan of an encampment in the Khuttuck hills, all the sickly Europeans be sent to Nowshera towards the end of August. At present, besides the barracks especially constructed at that place for them, full half the number of barracks for the European Regiment destined for Nowshera, are now ready. All these buildings would afford ample accommodation for 5 or 600 European soldiers. The Chief Commissioner would further point out that by the medical returns, forming a portion of the present correspondence, it would appear that although the sickness at Peshawur among the European soldiery, has been considerable during the last four years, the actual mortality has not been large : it has not averaged for the sickly months more than 2·4

per cent., but does not exceed 7·2 per annum. But it is probable that the mortality in the other months of the year was not one per cent.

Year.	<i>General average of deaths.</i>	
	In sickly season.	Rate per cent. per annum.
1852	3·2	9·6
1853	2·2	6·6
1854	2·9	8·7
1855	1·3	3·9
Average of 4 years—2·4		7·2

7. Again, it is very generally admitted that one of the main causes of the sickness and mortality among our troops at Peshawur in the Autumn months, arises

from severe work during the hot days and cold nights. But if the wall which was designed and sanctioned as an enclosure for the cantonments, were allowed to be constructed, three-fourths of the night duty might be dispensed with.

From Major H. R. JAMES, C. B., Commissioner and Superintendent, Peshawur Division, to the Military Secretary to Government, Punjab,—(No. 91, dated Abbottabad, the 16th October 1861.)

I HAVE the honor to acknowledge the receipt of your memorandum No. 3575 of 30th ultimo, and its enclosures, and to reply as follows :—

2. Since this correspondence took place, you are aware that His Honor has sanctioned the experiment of sending a small party of Europeans with a detachment of Native Infantry to encamp on the Cheerat hill. To such an arrangement I can see no possible objection in ordinary times, whilst it appears to suffice for the desired end. The Major General does not propose that the Murree Sanatorium should be at all superseded by Cheerat, therefore at the commencement of the season the invalids will be sent there as hitherto. Cheerat is intended for the speedy relief of soldiers suffering from the Autumnal fever usually prevalent at Peshawur. It would therefore be occupied from 15th August to 15th October; and although there will always be a risk of accidents, even in this partial occupation of Cheerat, yet I consider that this is outweighed by the great benefit accruing to our European soldiery.

3. The case would be different if the hill were permanently occupied. It is situated as you are aware, in the near proximity to Afreedee tribes; and the road which leads to it, passes over an extensive stony waste, intersected with numerous ravines leading down from the hills. The road is thus for the greater part of the distance far removed from villages



and police posts. Insecure at all times, it would be especially unsafe at night.

4. Now supposing permanent barracks to be established at Cheerat, we should probably have parties occupying them at all seasons of the year, and this would inevitably lead to the constant passage of camp followers and private servants along this road to and from Peshawur. We cannot doubt that many of these would be plundered and wounded, if nothing more serious happened. I need scarcely remind His Honor of the alarm and excitement recently caused by a Native servant being robbed at night on the Attock road by three bad characters of a neighbouring village, receiving a slight cut on the hand in the scuffle. Every paper in the country has taken up the senseless cry; and one of the safest roads in India has come to be looked on as the constant scene of daring outrages. What then would be the panic caused by the actual murder of some camp followers or servants?

5. We should be liable to such incidents, even when we were on the best terms with the hill tribes, amongst whom will always be found restless turbulent spirits, on the look out for mischief and plunder. As to the main body of the Afreedees, I am aware that our relations with them are vastly improved, and that their own interests prevent those open acts of hostility which were once so frequent; still their nature is not changed, and we may any day have a rupture with them; and on the occurrence of such an event, our position at Cheerat would be exposed to insult and annoyance.

6. I know that every possible arrangement would be made to prevent the travelling of individuals in a way which might endanger them, but at the same time we know from experience how difficult it is to enforce such rules. For instance, travelling along the frontier at night had been frequently and peremptorily forbidden, still the practice continued sometimes in ignorance of the prohibition. No evil happened for years, but at last Captain Meham was murdered, and the Government was involved in hostilities.

7. On a consideration of all the above circumstances, I think that no buildings should be erected at Cheerat, but that the hill should in ordinary times be available for encamping a detachment from the 15th August to 15th October. This should always be in communication with

the civil authorities, in order that special precautionary arrangements may be made for the above period.

From Lieutenant Colonel H. YULE, Secretary to the Government of India, Public Works Department, to Captain A. FRASER, Superintendent, Alguada Reef Lighthouse,—(No. 532, dated Fort William, the 10th February 1862.)

THERE has been unavoidable delay in obtaining the orders of the Governor General in Council on the subject of your letter No. 43, dated 26th June 1861, and its enclosures, *viz.*, the establishment of a Sanatorium at Callagouk.

2. Your proposal is to commence work with a party of 200 convicts, to be obtained from Moulmein, who would be employed in opening up the island, clearing building sites, facilitating the natural drainage of the island, and constructing the roads indicated by Dr. Macpherson. You have expressed your readiness to undertake the general charge of the work, provided you are allowed another assistant, who has passed for the department.

3. The Governor General in Council has perused the papers forwarded by you on the subject, including Dr. Macpherson's report; and His Excellency considers the proposal to carry out the preliminary works indicated to be a good one, and the experiment worth trying. The immediate occupation of the island after clearance, will of course be avoided, as you suggest.

4. You are therefore authorized to place yourself in communication with the local authorities at Moulmein, regarding the supply of convicts; and when definite arrangements are made, an additional assistant will be sent to you, if still absolutely necessary.

5. A copy of this letter and of the previous correspondence, has been sent to the Chief Commissioner of British Burmah.

#### ESTABLISHMENT OF A SANATORIUM AT CALLAGOUK.

From Captain A. FRASER, Superintendent, Alguada Reef Lighthouse, to the Secretary to the Government of India, Public Works Department,—(No. 43, dated the 26th June 1861.)

I HAVE the honor to draw your attention to the 12th paragraph of my letter No. 214, dated 1st September 1861.

2. I took advantage of the presence here for a short time of Doctor D. Macpherson, Inspector General of Hospitals, Madras Army, while on tour of inspection, to shew him this island and our sick returns. He was so much pleased with the beauty of the island, and its eligibility for a Sanatorium, that after fully exploring it, examining our medical officer and his books, and visiting the islands to the south, he has been induced to recommend it as such. He favoured me with a copy of his report on the subject, which I herewith forward, together with other documents, as the matter seems now worthy of consideration, by the Government of India.

3. Enclosure No. I. will explain how Dr. Macpherson came to accompany me; and as he entirely disapproves of the place near Tavoy, where I proposed making a branch establishment, I was very glad to act on his advice, and remain at Callagouk.

4. I should mention that "Curlew Island" is the English signification of the Burman name "Callagouk."

From D. MACPHERSON, Esq., M. D., Inspector General of Hospitals, Madras Army, to the Superintendent of Alguada Reef Lighthouse,—(No. 32, dated the 27th May 1861.)

I BEG to inform you of my arrival in this place, (Moulmein) after completing a medical inspection of the civil and military establishments in the upper portions of this province. I have yet to visit the stations of Tavoy and Mergui; and as your duties may oblige you to proceed in that direction in the steamer *Setang*, I will esteem it a great favor to be furnished with a passage in her.

2. Apart from the Medical Inspector of our stations, it is an important part of my duty to examine and report upon localities possessing advantages requisite for Sanatoria. No locality having been yet fixed on in the British possessions on this coast to which the European Invalid can resort, I am very desirous to make myself acquainted with the line of coast, and islands adjacent between this place and the Mergui Archipelago.

Your extensive local knowledge of those parts, and your professional experience as an engineer, induce me to solicit your aid and counsel in the important duties which occupy me.

3. The recent reduction of the military forces garrisoning these provinces, make it very desirable that they should be kept as effective, sanatorily considered, as circumstances will admit. As matters now stand, the invalid soldier has to be sent from the frontier military stations to the coast, and afterwards by sea at a great expense to Madras, and thence to England or elsewhere, as may be necessary.

4. My examinations and enquiries fully satisfy me that there are at present insuperable obstacles to the establishment of mountain Sanatoria within these provinces; all available elevated lands being situated in inaccessible positions, both as regards difficulty of communication and distances from stations in salubrity of intervening low country, and want of population and supplies *en route*. It appears to me, therefore, that our existing well-tried mountain Sanatoria in India must be the place of resort for European invalids in Burma, whose constitutions benefit by a residence on elevated localities; and that the object of Government should be, 1st, to improve our communication from the interior to the sea, and 2nd, to establish a sea-coast Sanatorium in a convenient position for invalids likely to benefit by a residence there.

5. I am satisfied that much of the expense and inconvenience now sustained by the State in transporting invalid soldiers of all classes to India, and the loss of their services for an indefinite period, are capable of reduction by the establishment of a sea-coast Sanatorium, either on the main land or on one of the numerous islands which stud this coast; and that it will advance the interests of Government if your other duties will enable you to associate yourself with me for a brief period in the prosecution of this enquiry.

*Report by D. MACPHERSON, Esq., M. D., Inspector General of Hospitals, Madras Establishment, on Callagouk or Curlew Island, in the Bay of Bengal as a Sea-Coast Sanatorium,—(dated the 24th June 1861.)*

IN the course of my inspections of the several stations of the army during the past three and half years, I have submitted to Government my views of the beneficial effects to the European constitution in health, and in convalescence from disease, of a residence on elevated mountain ranges, as a prophylactic remedy, under peculiar

states of the system. I pointed out during the progress of my tour how peculiarly favored the Presidency of Madras is in possessing elevated ranges contiguous to the chief military posts; and I selected certain places on the coast as the most eligible, which came under my notice as a place of resort for invalids, whose health would appear to derive benefit by a residence there.

2. There are, however, certain disadvantages in all sea-coast localities situated on the main land, and possessing no elevation, such as the absence of sea breeze, and the deleterious effects of land wind passing over miasmatic or extensive tracts of low arid plains at certain seasons, which an island is comparatively free from when placed in the midst of the ocean, of moderate dimensions, possessing bays, sandy beaches, and an undulating surface, a good water supply, and capabilities for draining.

3. The subject of Sanatoria for European troops stationed within the tropics, has engaged my special attention for many years, but hitherto I have in vain searched for a locality such as I have now adverted to. There is no place answering the description contiguous to the vast line of coast between Bombay and Calcutta, and in the Straits of Malacca. Although the Island of Penang certainly possesses very many advantages, it has its disadvantages also: it has no protected sandy bays, and the low land is so little above the level of the sea, that it is incapable of efficient drainage, hence "the hill," which is upwards of 2,000 feet high, is the only place of resort for invalids, and it is surrounded by such an extent of forest and low land that it cannot, strictly speaking, be viewed as a sea-coast Sanatorium. It is moreover too distant from our possessions in India to make it a place of general usefulness.

4. During my inspection of the Pegu province, I learned that European invalids of all classes, when they require a change, are sent to the coast, and thence transported to Madras at a great cost to the State in money and in loss of service; and no place in India can be worse adapted for sick men than the depôt of Poonamalee, to which these invalids are sent. (*Vide* my report on that locality.) There are insuperable obstacles to the establishment of mountain Sanatoria within or contiguous to the British possessions in Burmah, such desirable localities being situated in inaccessible positions, both as regards

difficulty of communication and distance from stations, insalubrity of intervening low country, want of population, and supplies *en route*. Our existing well-trying Sanatoria in India ought to be the sole place of resort for European invalids, whose constitutions benefit by a residence on elevated localities, and to this end, as regards the Pegu province, the object of Government should be to improve the communication from the frontier stations to the sea, and to establish a sea-coast Sanatorium in a convenient position, for such as are likely to benefit by a residence there.

5. The wonderfully remarkable sanatory condition of all European residents in the interior and on the sea coast of Burmah, the extent of that coast, and the groups of island which stud its shores from Amherst to the Mergui Archipelago, naturally drew my enquiries in that direction. I was thus brought into communication with Captain A. Fraser, of the Bengal Engineers, Superintendent, Alguada Reef Lighthouse, now under construction,—an Officer fully acquainted with the sea-board of Burmah. Duty obliging Captain A. Fraser to proceed in the direction of Mergui, he very obligingly agreed to afford me an opportunity of personally inspecting the line of coast, and islands contiguous; and on my solicitation, he cheerfully acceded to co-operate with me in the important field of enquiry which engaged me, thus aiding me with much valuable practical experience in his professional capacity, acquired in a career of 20 years, in selecting and laying out sites for the cantonment of troops, and in the construction of barracks.

6. *Amherst* was the first place we visited; and in the absence of an island Sanatorium there is no doubt that it presents the most eligible site on the coast. In form it is a promontory of land, washed on one side by the sea, and on the other by the Moulmein river, as it disembogues into the sea. It is well elevated, and possesses an open porous sub-soil beneath a clayey superstratum; but it has the disadvantage of dense jungle and swampy ground to the north-east, and muddy water on the river and sea sides; yet with judicious clearing and draining, Amherst would doubtless become a very desirable locality for invalids.

7. *Callagouk or Curlew Island*.—*The Moscos* contiguous to the mouth of Tavoy River; *Tavoy Island*, half way between Tavoy and

Mergui; and *Kings Island*, opposite Mergui, have come respectively under our enquiries. Of these, the first which occupies the subject of this report, is that in every respect the most suitable for a Sanatorium.

8. *Curlew Island*, the Head Quarters of the Alguada Reef Lighthouse establishment, is situated on the gulf of Martaban, five miles from the main land of the Tenasserim coast, and 30 miles south of Amherst point, in latitude  $15^{\circ} 52'$ , and in longitude  $97^{\circ} 42'$ . It is eight miles long, exclusive of "Cavendish Island," which lies at its extreme south end, and which is half a mile in length. The greatest breadth of the island is about one and a quarter mile, and on its highest part, which is about 500 feet above the sea, are the "remarkable trees,"—a point for navigators in making the coast.

9. The base of the island is primary rock, the superstratum being a rich mixture of open porous soil composed of sand and vegetable mould: its formation is very peculiar, the northern and southern portions differing considerably. The northern half on the western side is composed of a long granite ridge, with an average perpendicular drop to the sea, varying from 250 to 300 feet. To the east the ground descends to the sea in gentle or abrupt slopes. The opposite side of the island is broken into alternate or isolated hills, with level well raised intervening spaces forming three bays; the first Quarry Bay, where the stones are now being prepared for the Alguada Lighthouse, is the deepest at high water: the beach is sandy, but at ebb tide an extensive mud flat, covered in places with Mangrove, is exposed: the somewhat narrowness of the channel between the island and the main land on this side tending to the accumulation of mud.

10. The southern half of the island differs entirely from the northern, inasmuch as both sides are broken into bays. To the west, Retreat Bay, Rocky Bay, Sea Bay, and Fish Bay, are beautiful hard sandy beaches, well protected by high land on each side, and open to the ocean in front, with a fine rolling surface on the beach, and only divided from one another by projecting rocky points, and from the corresponding bays on the eastern side by well raised necks of land sloping east and west, free from all swampy grounds, and ascending north and south to the hills which divide the bays. The eastern bays look on the distant main land, rising in bold outline on the horizon. These very much resemble the western bays, in fact differ only by the

mud uncovering at half tides : the rise and fall at spring tides being 22 feet. All the bays on the eastern side are perfectly protected from the south-west monsoon ; while during the north-east monsoon the bay on the western side and the deep water close up to the ridge on the north, affords a free, open, and safe place for yachting and boating. The bays on both sides are peculiarly well suited for bathing, the water on the western side especially being always pure and clear, except at spring tides.

11. Ascending from Retreat Bay, the ridge referred to in paragraph 9 is reached. This ridge, and indeed the entire island, is clothed with fine primeval forest ; with trees of immense dimensions and height. Under their overshadowing branches, a well shaded road might with ease be carried along the ridge, having the open ocean on one hand, with the view of the fine contour of the island itself, and the bold coast of the Tenasserim provinces in the distance beyond, on the other. Here and there this ridge opens out into plateaus, forming beautiful sites for houses, and with the exception of a slight rise about the centre, the road would nearly run on a uniform level for a distance of five miles. The same road might there be extended to the southward, encircling the bay and crossing the intervening points of land, and also to the northern part of the island, where there is a considerable space of garden and cultivable ground. The free percolation of air by means of these roads, judicious clearing for building sites, and the adoption of measures to facilitate the natural drainage one year prior to the occupation of the island for sanatory purposes, are measures of the highest urgency and importance.

12. The island has now been occupied by a large party of workmen since April 1860. Usually the pioneers ~~or~~ settlers in every locality suffer considerably, especially where no prior arrangements have been made to guard against disease. In the present case a large body of Natives of India, Burmah, and China, European officers and subordinates, entered on operations of a harassing nature at the hottest season of the year. Quarry Bay, where they settled, is sanatorily considered by no means the best locality to settle on. But the presence of good stone and the facilities for shipping it to the Reef induced the superintendent to fix his head quarters here. I append a return of the strength of the establishment ; the prevailing disease,



and the mortality from the 3rd April 1860 to the 30th April 1861, from which it will be observed that, every thing considered, the sick and death rate have been unusually small. It must be borne in mind that the party for many months had little or no protection by night or by day, and that their huts occupied unwholesome sites in the midst of felled jungle; yet the report presents a gratifying immunity from the graver diseases. The fevers were chiefly of an ephemeral nature, the sick list being chiefly kept up by local injuries and their results; diseases not contracted on the island; and cutaneous affections from the want of antiscorbutic articles of diet.

*Daily average per cent. of prevailing diseases from 30th April 1860 to 30th April 1861.*

	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	Averages.
Strength ...	212	209	295	367	400	433	495	502	450	480	705	710	440
Dysentery ...	·09	2·07	...	...	...	..	·10	·36	...	·14	...	...	·23
Ulcers ...	0·7	5·1	3·1	4·1	5·5	3·8	2·6	3·5	4·1	2·1	2·08	3·64	3·38
Fever ...	0·8	1·0	0·9	1·0	1·2	1·5	3·4	4·9	4·1	4·1	2·3	1·55	2·17
Other diseases ..	5·05	8·61	6·13	6·14	7·05	8·01	4·25	5·99	5·30	16·74	11·99	22·22	6·13

There were nine deaths during the year from diseases contracted on the island, *viz.*—

3 from dysentery in January.

3 „ fever from exposure; one in July, one in November, and one in January.

3 from accidents and other diseases.

No deaths occurred amongst the Europeans.

13. During the 10 days of my residence on the island in the months of May and June, the climate was exceedingly agreeable: the nights were cool, and no punkahs were necessary during the day. In fact a refreshing sea breeze was present at all times in every part of the island visited by me during the day, and a blanket was always

grateful at night. The average thermometer at this period during the day is 75°; during the hot weather it is 88°; and Captain Fraser speaks in glowing terms of the climate at all seasons as compared with that in Calcutta. Water of an excellent quality is procurable at a depth of 15 feet, and a perennial spring of sweet water flows through the centre of the island. The rain-fall, Captain Fraser thinks, is under that experienced on the main land opposite.

14. The great advantage of this island is its proximity to Madras and Calcutta, and to the principal stations in Burmah. The large town of Yea, and the village of Lemyne, is on the opposite main land, from whence small boats with supplies are constantly arriving, and it is on the direct line of communication between Calcutta and the ports of Tavoy and Mergui, so that with properly arranged communications, there need be no difficulty in furnishing it with supplies. China junks bring fruit and other articles to the island; and fish of an excellent quality is procurable at the bays.

15. Besides affording many beautiful localities for private houses, abundance of space is available for 1,000 men on eligible sites; but the planning and laying out of the island, so as to turn it to the best advantage, must be placed in the hands of a person well acquainted with its capabilities, and who has an interest in the work. Captain Fraser's other duties constrain him to reside on the island for many months of the year. We have gone together all over it, and by his report, which accompanies this, it will be observed how fully he concurs with me in its capabilities; and that with the sanction of Government, he is willing to undertake the superintendence of the preparatory improvements above recommended. No one is better qualified to undertake this important duty than Captain Fraser, for in addition to his practical knowledge as an engineer, he takes a deep interest in the improvement of the place, with the view to its future occupation. I beg therefore to recommend that Government avail themselves of the opportune residence of this able officer on the spot, and place a grant of money at his disposal, with full power to expend it to the best of his judgment. Mr. Ccomarty, the surgeon in charge, an able and observant medical man, proffers his assistance in keeping careful meteorological observations, or in any other way that Captain Fraser may employ him.

16. As I have already observed, no place has come under my observation within these tropics, during a long period of close enquiry, possessing the numerous advantages for a "watering place" or sea-coast Sanatorium, which this island presents. The equability of its climate, its protected sandy bays and beaches, and its fine sea water, with the whole expanse of the gulf in front, make it a peculiarly desirable locality for bathing purposes. The numerous means of recreation that always present themselves on the sea shore; its excellent water-supply, well raised surface, eligible sites for buildings, and the fertility of its soil; its moderate dimensions, whereby the entire island can with care be kept under satisfactory hygienic control, and the facility of its approach at all seasons, and above all its already proved excellent qualities as a Sanatorium, under many disadvantages, especially where structural disease is threatened, mark it as a most promising locality, and demand that Government take an interest in its development. In conclusion I may state that no case of sickness or death has occurred amongst a large number of women and children, families of the working residents, since the first occupation of the island. The eye sketch of the island accompanies this report.

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From Captain A. FRASER, Superintendent, Algnada Reef Lighthouse, to the Inspector General of Hospitals, Madras Army,--(No. 42, dated the 24th June 1861.)

I HAVE the honor to acknowledge the receipt of your letter No. 32, dated 27th May 1861, in which you requested a passage in the steamer *Setang* to Tavoy and Mergui, and desired my co-operation in the prosecution of your enquiries as to a fit position for the establishment on this coast of a Sanatorium for the European invalid soldiers.

2. My duties calling me to Tavoy, enabled me to do as you wished; and it has given me much pleasure to afford you such information as my experience on this coast enables me to give. I have since read your report, received with your letter No. 35 of this date, as regards Callagouk or Curlew Island, and I go with you in every word you have said on its capabilities for the end you have in view, and am of opinion that it is superior in position, in accessibility, in its moderate, and therefore controllable size, and in the great variety of hill and dale, sandy beaches, and perpendicular cliffs, to any place that I know on the coast, for the purpose of forming a delightful and healthy residence for Europeans.

3. On the 1st September 1860, I had the honor of addressing the Secretary to the Government of India in the Public Works Department, on this very subject, and I submitted to you a copy of the paragraph of my letter which specially referred to it. The Government passed no order on that part of my letter, probably because it only formed a part of my regular half-yearly report; and the matter was not brought specially to their notice, and I have not since adverted to it, partly because the sickness of my work-people, after last rains, was rather more than I had expected, and partly because I felt that my remarks on such a subject would carry with them little weight, unsupported by eminent medical authority.

4. When you proposed to accompany me in my trip to Tavoy, I felt that I should have an opportunity of showing you the capabilities of this island, which I knew from my own practical experience, were very great, and of securing, if I was right in my own judgment, that opinion which was alone necessary to cause the Government to appreciate the value of the island as a sea-coast Sanatorium. My only doubt was as regards Tavoy Island, which I thought might be more suitable. I had never visited it, but had heard good accounts of it; and as one of my Lighters had to go to Mergui, I was glad to tow her down, visiting with you that island *en route*. I quite agree, however, with you, that it is in no way equal to Callagouk for the purpose you have in view.

5. You have explored this island in a more complete way than I myself have even had time to do before. You have carefully examined into the cases of sickness which have occurred in the hospital; and I am very glad to see that you come to the conclusion that such disease as we have had, does not arise from the unhealthiness of the island, but from the nature of the work, and the peculiarity of our position. All places are more or less unhealthy in Burmah, according to my experience, on their first clearance, and I have been obliged to a great extent to place my people with reference to the work they had to do, rather than to their sanatory condition. Had I had more time, I might have placed them better, but the one work I have now in hand is so far advanced, that it would be a pity to move, if it can be avoided; and with the advice I have received from you, I have no doubt that next year we shall not suffer so much even from the slight disease which

troubled us last season. The state of the hospital at this very time could scarcely be more satisfactory.

6. Those who come here and go no further than the small space upon which my establishment is settled, know nothing of the beauties or capabilities of Callagouk; and those who only look at the number of sick without going into the causes of disease, or making themselves acquainted with the constant exposure of all hands, both at the Reef and at this island, are apt to think the situation unhealthy: but both the fever and the ulcers, the chief diseases from which we have suffered (the ulcers confined, however, only to the Natives,) may be traced to the nature of the work. Men come down here without any better clothing than they are accustomed to, and the constant cool wind which blows here gives them cold and slight fever and ague; while the constant working among sharp stones causes bruises and abrasions of the skin, which, without a good vegetable diet, are apt to turn to ulcers. You are aware that the difficulties about vegetables can be overcome, for I know of no place which affords such facilities for gardening when the ground has been cleared. There would be no fever either, were sufficient time allowed for the malaria consequent on the clearance to pass away, before men were located here.

7. If the Government saw fit, on your report, to adopt this as a sea-coast Sanatorium, I do not see that much expense need be gone to, that is, cash expenditure. I should be most happy to take general charge of the work, and if I were allowed another assistant, a smart young Infantry officer, who has passed for the Department, I could well work the thing out according to your views with 200 convicts (who could be kept separate from my own workmen to the south of the island,) from Moulmein. These I have no doubt, Lieutenant Colonel Fytche, the commissioner of the Tenasserim and Martaban provinces, would willingly give, as it would be so greatly to the general improvement of the provinces under his control. But in my opinion, no large bodies of troops should be located here till the third year after the clearance of the jungle, though it will be doubtless possible to erect private bungalows at a much earlier date.

8. I have already done a little towards opening up the island: the quantity of wood I require for my steamer enables me to do so. I shall be truly happy if the Government will allow me to do more, as

I shall feel that I shall be doing that which will prove a lasting benefit to the European community and soldiery of India.

9. So accessible is Callagouk, that were it properly laid out and well known, I feel sure its pure air and the sea bathing, combined with the beautiful scenery, would induce all, whether in Calcutta or Madras, or the chief towns and stations in Burmah, to make it their resort for the renovation of health, whether of mind or body.

10. In conclusion I beg to thank you most sincerely for the trouble you have taken and the advice you have given for the improvement of the sanatory condition of our present settlement; and I have no doubt that by carrying out the measures you have proposed, so far as our means will allow, we shall reap the benefit thereof by improved health next year.

Extract from a letter from Captain A. FRASER, Superintendent, Alguada Reef Lighthouse, to the Secretary to the Government of India, Public Works Department,—(No. 214, dated the 1st September 1860.)

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*Para. 12.*—"There is one other point, however, I wish to lay before the Governor General in Council for His Excellency's consideration. It has been the habit of the Government to look for healthy positions for its troops in most impracticable situations, where vast expense has to be gone to in making roads, &c., &c., and where, even with all imaginable conveniences of transport, the mere conveyance of troops with their baggage cause a large expenditure to the State, as compared with the cost, if a healthy situation could be found where water carriage could be available. Why should not the Government leave the beaten track for once as an experiment, and try a watering place as a Sanatorium? I think Callagouk offers all the facilities for such an experiment: on the western side are sandy sea beaches with the whole expanse of the gulf in front, while on the eastern side there is a fine harbour, five or six miles wide from the main land, protected from the violence of the south-west monsoon. So far as I see at present, a Sanatorium could be established here for a thousand men, within five or six day's run of Madras or Calcutta, and within a day's run of the principal stations in Burmah. Communication could be kept up by the station steamer at Moulmein calling here on her

monthly trips to the southward; and by keeping up a depôt of wood fuel here, it would cost the Government little more to make her go twice a month instead of once, while burning such wood would always tend to clear the island. There is no cold or bracing weather here it is true, but the equality of the climate, the sea bathing, the numerous means of recreation that always present themselves on the sea-shore, would more than compensate for the want of this; while the Government would have the men just as available for service at a less expense as if they were put down on the top of the Himalaya mountains. I of course would not recommend that any thing be done in a hurry; but if the Government thought the plan worth consideration, I would do things—especially clear jungle—with that view, and be careful to register regular thermometrical and other observations; though the practical test that will be afforded by the state of our own health will be the best proof of the salubrity or otherwise of the island. The health of the community will be in its lowest state, I expect, during the next two months, from temporary causes only—hitherto nothing could be more satisfactory, especially as regards the Europeans. The soil is fertile in the extreme, and gardening would be attended with no difficulty. In fact I think Callagouk would afford the two desiderata of a Sanatorium: pure air and pure sea water to bathe in; and means of recreation might be added with much greater facility than in the hills, which would make this island a most pleasing place of residence to the soldier.











